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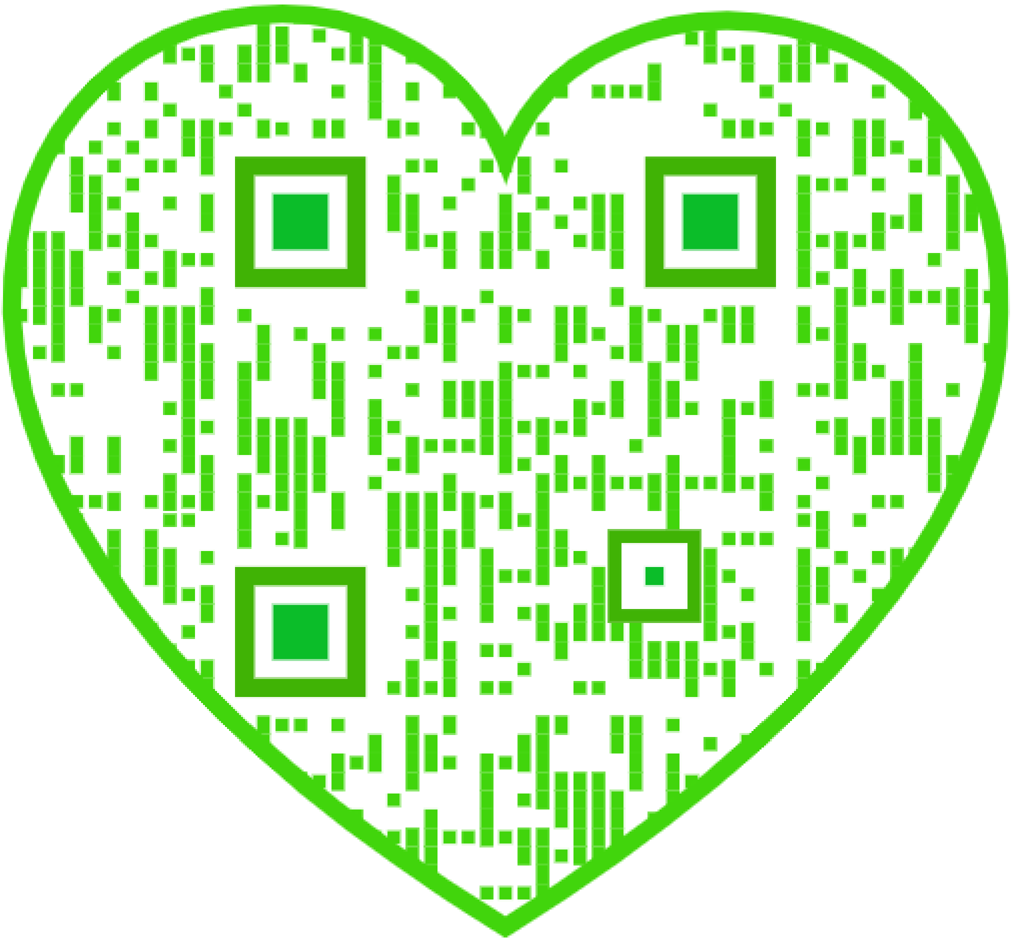

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**ISSUE 430**

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# GOOD THINGS IN SMALL PACKAGES

In response to my 'Comment' piece in the last issue's news section regarding EVFs – or, rather, the lack of them in so-called vlogging mirrorless cameras – a reader sent me an interesting email, adding some further observations which got me thinking about a related topic. In my 'Comment' piece I observed that if Canon could put a perfectly good EVF into the superbly-compact PowerShot G5X (the first-gen model, by the way), for example, then there really is no excuse for not having one in the likes of the Fujifilm X-M5 or the Panasonic Lumix S9. Regardless of whether vlogging cameras are primarily designed for video – when having an EVF isn't so important – they surely have other applications. As you'll read in our test of the X-M5, it really is a brilliant little package that's however flawed by not having an eyelevel viewfinder which would really increase its appeal for photographers. Tying in with another topic I discussed a while back, it does seem that the camera-makers don't want us photographers being seduced by more affordable entry-level models when they could potentially get you behind something much pricier. And, increasingly these days, something bigger and heavier.

My correspondent noted that he's been using a PowerShot G5X for years because of its very small size combined with 'big camera' features including compatibility with Canon's e-TTL flash system. He even still uses it to shoot events paired with a compatible Godox flash gun which he hand-holds off-camera to avoid red-eye. He notes too, that the smaller sensor's inherently greater depth-of-field is advantageous when photographing, for example, people sitting at a long table, ensuring everybody is in focus. So, tell me, when did smaller-sized sensors start getting a bad rap? After all, creating more compact cameras – and lenses – was initially one of the key design briefs behind the mirrorless configuration, and the likes of Nikon and Pentax thought that even the Micro Four Thirds sensor size was too big… hence the 1 Nikon and Q subcompact systems. Now there are mirrorless camera bodies that make full frame DSLRs look small… and they're either MFT or 'APS-C' format! Cameras like the PowerShot G5X (2015) were smaller again, but still very capable with, in this particular case, 20.2 megapixels res and a 24-100mm equivalent zoom. The 1-inch size sensor actually performed very well as did the even-smaller 12 MP 2/3-inch 'X-Trans II' imager in the Fujifilm X30 (2014) that I owned for quite a while and used extensively – and successfully – when travelling. It had an OLED EVF, but the earlier X20 used a simplified version of Fujifilm's famed hybrid optical 'finder. Sony's third-gen Cyber-shot RX100 (2014) introduced a pop-up EVF with opinion still divided on how well it works… but it's still better than nothing (and, incidentally, the Mk. VII version remains available) Other notables were the Four-Thirds format Panasonic Lumix LX100 (2014) and LX100 II (2018) along with their Leica D-Lux doubles if you were happy to pay premium for the red-dot badge, and of course, Canon's G1X PowerShots… the Mark I (2012) with an OVF, the Mark III (2017) with an EVF and the Mark II (2014) with the less desirable option of a plug-in accessory EVF, but you'd live with it given everything else about that particular model. For a while during the 'twenty-teens', there was a reasonable choice if you wanted a high-end digital compact camera with a viewfinder and some sort of fixed zoom lens – and lots of photographers did, even pros. They still do if the buoyant second hand prices of some of these models are anything to go by which is perhaps not so surprising when the only new options are the Leica D-Lux 8 at around $2800 and the aforementioned Sony RX100 VII at a shade under $1700. The 1-inch sensor, in particular, delivered a brilliant balance of camera size and imaging performance, but the 4/3 Lumixes were also superb, especially the Mark II with a 17 MP sensor matched to the 24-75mm (equivalent) f/1.7-2.8 zoom. Even the most compact mirrorless models available now are still bigger and heavier overall.

There was something hugely appealing about these fixed-lens compacts, not the least aspect being that they'd easily fit into a jacket pocket or a small bag and yet could still pretty well do everything that you wanted… hello, freedom. I can't help thinking that the cameras that ate all the pies have – at least partially – contributed to people preferring to use their smartphones for photography, especially when travelling. Make small big again.

Paul Burrows

**Paul Burrows, Editor.**

**Camera** magazine is a member of the Technical Image Press Association. Visit **www.tipa.com**

**OUR FRONT COVER:** Starring on this issue's front cover is the new OM System OM-3 which is basically the same size as the original 35mm OM-1, but has all the key features of the flagship OM-1 Mark II… plus, of course, it looks fabulous. We were among the first photo magazines anywhere to get our hands on one, so our full test starts on page 14. The inset image is by Italian photographer Federico Delucchi (Italy), and won The Exciting Sky Award, in the 11th International Landscape Photographer Of The Year. For more winners and finalists go to page 24.

# CONTENTS

## AUSTRALIAN CAMERA MAGAZINE – ISSUE 430

**Page 24:** 11th International Landscape Photographer Of The Year
Image by Jeff Lovelace © 2025

## REGULARS

### 6 WHAT'S NEW

Leica has quickly followed up the SL3 with the zippier SL3-S which shares the same bodyshell and revised control layout, but combines 24 MP resolution 30 fps continuous shooting and is the first SL series model with content credentials technology. OM Digital Solutions goes full-on retro with its new and compact OM-3, but this camera has both beauty and brains, inheriting just about all the high-end features and specs from the OM-1 Mark II. OMDS has also taken the opportunity to update three lenses – including the popular 100-400mm telezoom – now rebranded OM System and with enhanced performance. Sigma has made good on its promise of lenses for the Canon RF mount, kicking off with six models – four primes and two zooms – for the 'APS-C' bodies, currently comprising the EOS R100, R50, R10 and the R7. Lighting company Profoto has introduced its most powerful battery-powered flash monobloc to date – the new and more rugged Pro-B3 can deliver up to 750 joules for on-location lighting in challenging conditions. Also check out our exhibition listings – there's some great shows on around the country over the coming months.

### 12 LIGHT WORK

These pictorial features are designed to help you better appreciate how successful photographers deal with different subjects and situations to create a memorable photograph. In this issue, we find out the story behind the dramatic – and icy – picture which won the 8th International Wedding Photograph Of The Year competition.

© Bettina Vass 2025

# CONTENTS

## 78 SIGMA SHOWCASE 2025

Our Showcase sponsor, Sigma lenses, is providing the competition's grand prize of a lens – your choice of model and mount – valued at up to $1000. The 2025 Showcase is now up and running and we're judging all the 2024 winners and will announce the overall winner in our next issue. Submit your entries online at camera@futurenet.com

## 80 CAMERA BUYER'S CHECKLISTS – MIRRORLESS CAMERAS, DIGITAL RF CAMERAS AND DSLRS

Does 2025 look like the year you treat yourself to a new camera? Go, on, you know you want to, and here's where to start. Our camera checklists for mirrorless cameras, DSLRs and the digital RF models allow you to directly compare key specifications and features at the main price points.

# FEATURES

## 24 COMPETITION

### 11TH INTERNATIONAL LANDSCAPE PHOTOGRAPHER OF THE YEAR

"I don't have to explain the importance of patience, persistence and determination to a landscape photographer," says the chief judge of the 11th ILOPTY competition, and the rewards of all three of these attributes are clearly evident in the latest winning images.

## 46 IN PRACTICE

### BACK TO BASICS: ALL ABOUT EXPOSURE CONTROL

It's the most critical process in photography and has both significant technical and creative implications. To achieve the results that you really want, it's essential to understand the principles involved and how to make them work for you.

## 62 IN PRACTICE

### THE MIRACLE (AND SCIENCE) OF MIRROR LENSES

Pay attention now… there are mirrorless system lenses and then there are mirror lenses. And you can put a mirror lens on your mirrorless camera. What's it all about? Well, it's all done with mirrors… really! Here's everything you need to know.

## 68 CAMERA ICONS

### CANON AE-1 AND AE-1 PROGRAM

It's true to say that the AE-1 made a very big contribution to Canon becoming the dominant brand in 35mm SLRs and on into the digital age. The combination of size, handling, features and performance made it a best-seller to the tune of four million units. The AE-1 Program subsequently chalked up another two million sales. Nothing has got close to these numbers since.

# ON TRIAL

## 14 ON TRIAL

### OM SYSTEM OM-3

The original 35mm Olympus OM-1 is still one of the prettiest cameras ever made so it's no surprise that OM Digital Solutions has used it as the inspiration for the new OM System OM-3… which, consequently, certainly looks like one of the prettiest mirrorless cameras ever made. Its beauty, however, goes well beyond its good looks.

## 36 ON TRIAL

### FUJIFILM X-M5

While Fujifilm is primarily promoting the X-M5 to video content creators, its combination of compact dimensions with all the latest 5th-gen X mount tech and features makes it an attractive proposition for photographers too.

## 56 ON TRIAL

### FUJINON XF 500mm f/5.6 R LM OIS WR

Fujifilm's X mount mirrorless system gets its first supertelephoto prime lens which delivers an effective focal length of 762mm, but thanks to its manageable size and weight – plus optical image stabilisation – it can be comfortably used hand-held.

## 70 CLASSIC ON TRIAL

### RICOH GXR

It was a bold idea that ultimately ran out of steam, but Ricoh's innovative take on the mirrorless camera concept still has merit today… and it's interesting to ponder what might have been had the GXR system been further developed.

**Page 56:** Fujinon XF 500mm f/5.6 R LM OIS WR

# SIGMA DC DN LENSES FOR THE CANON RF-S MOUNT

30mm 1:1.4 DC DN ⌀52
SIGMA
16mm 1:1.4 DC DN ⌀67
SIGMA
56mm 1:1.4 DC DN ⌀55
SIGMA

▲Sigma 30mm f/1.4 DC DN Contemporary for Canon RF-S.

▲Sigma 16mm f/1.4 DC DN Contemporary for Canon RF-S.

▲Sigma 56mm f/1.4 DC DN Contemporary for Canon RF-S.

**SIGMA IS NOW** offering six of its DC DN zoom and prime lenses for Canon's 'APS-C' format RF mount mirrorless cameras – currently comprising the EOS R100, R50, R10 and the R7 models. The license agreement means that the Sigma lenses fully integrate with the AF systems, Exif data exchange, in-camera lens corrections and in-body image stabilisation in the R10 and the R7, and the first three facilities on the R100 and R50 (which don't have IBIS). The autofocus drive control program is specifically tuned for each lens with high-speed data transmission so these lenses off fast autofocusing response and reliable subject tracking. They're also fully compatible with in-camera aberration correction, including for peripheral illumination (vignetting), chromatic aberrations and distortion. By matching corrections to the optical characteristics of the lens, image quality is taken to an even higher level.

The arrival of Sigma's RF mount models is good news for the owners of these cameras, significantly expanding their choice of fully compatible lenses. The current line-up comprises two zooms and four fast primes. All are Contemporary series lenses and the two zoom models are the 18-50mm f/2.8 DC DN which is equivalent to 29-80mm on the Canon mirrorless bodies (the focal length magnification factor is1.6x), and the 10-18mm f/2.8 DC DN Contemporary (equivalent to 16-29mm), currently the world's smallest and lightest ultra-wide-angle zoom lens for 'APS-C' format mirrorless cameras.

The prime lenses are the 16mm f/1.4 DC DN, the 23mm f/1.4 DC DN, the 30mm f/1.4 DC DN and the 56mm f/1.4 DC DN. The effective focal lengths on the Canon 'APS-C' RF mount mirrorless camera bodies are respectively; 26mm, 37mm, 46mm and 90mm.

Sigma lenses are distributed in Australia by C.R. Kennedy Photo Imaging. **For more information visit https://sigmaphoto.com.au**

**COMMENT**

Canon
AE-1
PROGRAM
CANON LENS FD 50mm 1:1.4
CANON
LENS MADE IN JAPAN

Is Canon's hugely popular 35mm AE-1 (and AE-1 Program) ready for a digital reprise as an RF mount mirrorless camera?

# RETRO RESPECT

**IT'S FAIR TO** say that the retro camera trend was kicked off by Nikon's Zfc and then really gained serious momentum with the full frame Zf which has been a huge seller. Yes, Fujifilm has been championing traditional control dials on its X-T line for ever, but this hasn't been with the intention of replicating any of the Fujica 35mm SLRs from the past. No, retro means reprising a classic design – such as the FM2 in the case of the Zf – and the new OM System OM-3 very much pays homage to the legendary OM-1.

What's the appeal? Well, if you've directly experienced the originals, then it's the attraction of going back to something that was associated with great photos and fond memories, not to mention a degree of familiarity (which is undoubtedly also the case with the Fujifilm X-T and X-Pro models). If you're of a more recent vintage, it's all about the looks and the individuality… as well as the combination of classical design and contemporary efficiencies. As the owner of a Zf – couldn't resist, could I? – I know the camera attracts attention and admiring comments because it just looks so good. It's as much about the proportions as the dials and Nikon has got it just right with the Zf… as has OM Digital Solutions with the OM-3. Really, you can look at any of the 35mm SLRs from the 1970s, amateur or pro – and they look just like you'd expect a real camera to look, but also elegant with a purity of form and function. It's not by accident that just about any camera icon that you see today is the front profile of 35mm-sized SLR.

So, as any camera maker with a heritage, you'd have to be thinking about diving into the back catalogue, wouldn't you? The Zf has convincingly proved the business case, and better still, this is a model that doesn't need regular updating. It is, as they say, what it is. Rumours persist of a Canon 'RE-1' – an RF mount mirrorless reprisal of the 35mm AE-1 which was such a big hit after it was launched in 1976 (and, coincidentally, the subject of this issue's Camera Icons). It was undoubtedly one of the most important 35mm SLRs and, along with the later AE-1 Program model, sold over six million units. Canon would be mad not to do the RE-1, and an option could be to base it on an updated RP platform.

And what about Pentax? Makes even more sense since it's now the sole promoter of the DSLR and the Pentax history is littered with great 35mm SLRs… a digital Spotmatic anyone? The K mount is still going strong so this looks like a bit of a no-brainer, although there's the likelihood of a revived Pentax 35mm SLR in the near future so that's probably more of a priority.

However, this raises an interesting question. Is a fully retro-styled digital camera – mirrorless or DSLR – a better proposition than a revisited film model? The Zf and Zfc would suggest that the answer is yes. The film renaissance is undoubtedly going to continue gathering strength, but film isn't for everybody… there's a fairly big divide between the romantic notion and the reality. A camera that delivers something close to the film experience, but without all the actual fuss and bother (which, let's be honest, is what it is if you've never done it before) is a much more attractive idea. The Zf and OM-3 convincingly prove the point. I have an original Olympus OM-3 in my collection and, not surprisingly, got it out to do the obvious new-and-old picture. It's one of my absolute favourite mechanical 35mm SLRs, but would I choose to shoot with it over the new camera? Nope. On the hand, the OM System OM-3 is very hard to put down and it's going to be a best seller without a doubt – and, like the Zf, defying both brand and sensor format loyalties.

The bottom line is that, if you want one of these retro-style cameras, you really, really want it.

- **Paul Burrows, Editor.**

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RICOH GR IIIx
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# LEICA LAUNCHES ITS FASTEST SL MIRRORLESS CAMERA EVER

**AS EXPECTED A** faster version of the Leica SL3 has arrived, swapping the 60.3 megapixels sensor for a 24.6 megapixels BSI-CMOS imager and thus enabling continuous shooting at up to 30 fps with full AF/AE adjustment. This speed makes it the fastest SL series mirrorless camera to date, and it can be maintained with image quality settings up to 12-bit RAW (DNG). An 8.0 GB buffer memory allows for a burst length of 175 frames when shooting at 30 fps. RAWs with 14-bit capture can be captured at lower speeds. As with the SL3, the camera has dual memory card slots for CFexpress Type B devices and for SD with UHS-II speed support.

The SL3-S is immediately distinguishable from the high-res model by its blacked-in 'Leica' nameplate, but retains a durable all-metal bodyshell – using a combination of magnesium alloy and aluminium – sealed against dust and moisture to the exacting IP54 standard and also freeze-proofed. As with the SL3, the 'S' is slight more compact and lighter than its predecessor. The SL3-S is also the first SL series model to incorporate content credentials technology as per the Content Authenticity Initiative (CAI). This enables image files to be signed with tamper-proof metadata, such as the camera model and author information, as well as creation and editing data. In order to prove authenticity with verifiable image content and to make any edits transparent, the file's content credentials can be checked using freely-available verification tools.

The sensor in the SL3-S is essentially the same as that used the Panasonic Lumix S5II cameras and a number of the Leica's features are the product of the L2 Technology tie-up between the two companies. Leica quotes a dynamic range of up to 15 stops and a sensitivity range equivalent to ISO 50 to 200,000. The sensor enables phase-detection autofocusing with 779 detection points. The sensor is matched with Leica's latest 'Maestro IV' processor (as used in the SL3) which drives, among other things, AI-based subject recognition AF and tracking with settings for humans – either faces or eyes – and animals which includes dogs and cats. Sensor shifting provides five-axis image stabilisation with correction for camera shake of up to 5.5 stops. Pixel-level shifting drives a multi-shot high-res function which has both handheld and tripod models and gives up to 96 megapixels with either JPEG or RAW capture.

The SL3-S's EVF uses an OLED panel with a resolution of 5.76 megadots and a magnification of 0.76x while the monitor screen has a resolution of 2.33 megadots and is adjustable for up/down tilts. It has the same revised touch screen interface as the SL3 and, in terms of the external control layout, there's the same arrangement of three input wheels or command dials. This allows for all the key exposure setting controls – apertures, shutter speeds and ISO – to have dedicated adjusters. The 'S' model also uses the same higher-capacity BP-SCL6 battery which has 2200 mAh on tap which Leica estimates is for good for a little over 1000 shots per charge based on a typical shooting cycle. In camera recharging via USB C is supported.

The video specs top 6K at 24/25/30 fps in either the 17:9 or 16:9 framing, but also with 'open gate' recording in the 3:2 aspect (5952x3968 pixels) for format flexibility (for example, the 9:16 vertical aspect). This is with 10-bit 4:2:0 colour, but 4:2:2 subsampling kicks in with the 4K UHD/DCI settings which are recorded uncropped at 25/30 fps, but with a 1.45x crop at 50/60 fps. Full HD recording is uncropped and also possible at the high-speed frame rates of 100/120 fps for slowmo effects. 5.8 K DCI (up to 25/30 fps), 4K DCI (up to 50/60 fps) and Full HD (also up to 50/60 fps) is available with the ProRes 422HQ codec for internal recording without any time limited. For external recording via HDMI (there's a full-size Type A connector), the camera can output RAW video up to 5.9K at 25/30 fps. There's a choice of the MOV and MP4 formats, L-Log and HLG (HDR) profiles, time coding, LUT compatibility and MIMO 2x2 multi-channel WiFi with 'Frame.io Camera to Cloud' support coming mid-year.

The Leica SL3-S is priced at $8990 body only. For more information visit **https://au.leica-camera.com** To purchase online go to **https://leica-store.com.au**

# KAYELL APPOINTED AUSTRALIAN DISTRIBUTOR FOR BRONCOLOR FLASH GEAR

**LEADING PROFESSIONAL PHOTO,** video and graphic arts supplier Kayell Australia is the new Australian distributor of Broncolor lighting equipment and accessories.

For various reasons Australian photographers recently have only had access to a select line-up of Broncolor products. With this new partnership, Kayell says it will now reintroduce the complete Broncolor portfolio, including the company's latest innovations in lighting technology. Kayell also plans to provide repair services for Broncolor products through its service centre in Sydney.

"We are thrilled to expand our offering with Broncolor products and services to the Australian market," comments Robert Gatto, who is the managing director of Kayell Australia. "Broncolor has long been a trusted name in high-quality lighting, and we're proud to bring the full range of their exceptional products back to local photographers. Whether you're a studio photographer or a location shooter, our goal is to ensure you have access to the best tools to help you create your best work.

"We understand how important it is for professional photographers to have reliable, high-performance lighting gear. With Kayell's expertise in the industry and our commitment to customer service, we're confident that we can deliver the best experience for Australian photographers looking to enhance their work with Broncolor."

Kayell already handles quite a number of lighting product lines including from Elinchrom, Godox and Aputure, Lastolite, Xlite and Westcott. Broncolor's current offerings include the Siros S mains-powered monoblocs and the Siros L series of battery-powered units along with the Scoro and Satos lines of flash power packs, the latter offering dual mains/battery power options via plug-in modules.

For more information about Broncolor's current range of products or to access the support portal, visit **www.kayellaustralia.com.au**

# OM SYSTEM UPDATES THREE OLYMPUS LENSES

FULL
1.3 – 6m
6m – ∞
AF
MF
IS
ON
OFF

▶ OM System M.Zuiko Digital 100-400mm f/5.6-6.3 II.

**ANNOUNCED ALONG WITH** the OM-3 are updates to three lenses from the previous Olympus OM-D system which obviously get a change of branding, but also some design revisions. Obvious companions for the OM-3 because of their compact dimensions are two primes – the OM System M.Zuiko Digital 25mm f/1.8 II (equivalent to 50mm) and the 17mm f/1.8 II (equivalent to 34mm). Both have metal barrel constructions and are now weather-sealed to the IPX1 standard to protect against dust and moisture. The 17mm's optical construction employs nine elements in six groups which includes four special types – two aspherical, one with a high refractive index (HR) and one 'Dual Super Aspherical (DSA) which is particularly effective at correcting for both distortion and chromatic aberrations. This lens also uses the OM System's 'ZERO' (Zuiko Extra-Low Reflection Optical) multi-coating to minimise internal reflections and thereby enhance contrast. Weighing in at just 112 grams, the new 17mm f/1.8 II is only 37.6 millimetres in length and has a 46 millimetres screwthread filter fitting. The minimum focusing distance is 25 centimetres and the minimum aperture is f/22.

OM SYSTEM 25 mm 1:1.8 II MSC
0.25m/0.82ft-∞ SPLASH PROOF

▲OM System M.Zuiko Digital 25mm f/1.8 II.

OM SYSTEM 17 mm 1:1.8 II MSC
0.25m/0.82ft-∞ SPLASH PROOF

▲ OM System M.Zuiko Digital 17mm f/1.8 II.

The new 25mm f/1.8 II weighs 156 grams and is 42 millimetres in length. It also has a 46 millimetres filter fitting and uses the 'ZERO' multi-coating to counter ghosting and flare. Its optical construction comprises nine elements in seven groups, including two aspherical types.

The new OM System-badged 100-400mm telezoom (which is equivalent to 200-800mm) has improvements to its weather-proofing and optical image stabilisation (OIS) system. The weather protection now includes a fluorine coating on the exposed surface of the front element to help better repel moisture and grease while also enabling easier cleaning. The OIS is significantly more effective than previously giving up to 4.5 stops of correction for camera shake on its own (compared to three stops previously), and up to seven stops at 100mm with 'Sync IS' which works with the camera-based in-body image stabilisation (IBIS). At 400mm, 'Sync IS' provides up to 5.5 stops of correction. The earlier lens didn't support 'Sync IS'. The new model also allows for its tripod-mounting collar to be removed while it's attached to a camera body which wasn't possible before. There's also a small reduction in the new model's weight – down to 1300 grams from 1325 grams, and it's just fractionally shorter overall. As before, the Mark II 100-400mm is compatible with the OM System M.Zuiko Digital teleconverters with the MC-14 (1.4x) giving an effective focal range of 280-1120mm with a maximum aperture range of f/7.1-9.0, and the MC-20 (2.0x) delivering 400-1600mm and f/10-13. Both the teleconverters support the 'Sync IS' image stabilisation.

The OM System M.Zuiko Digital 25mm f/1.8 II is priced at $599 and the 17mm f/1.8 II at $649. The M.Zuiko Digital 100-400mm f/5.6-6.3 II costs $2,199. All are available in Australia now. For more information visit **https://explore.omsystem.com/au/en/**

# PRO-B3 750 IS PROFOTO'S MORE ADVENTUROUS ON-LOCATION FLASH MONOBLOC

**FEATURING A MORE** rugged external construction to withstand the wear and tear of shooting in remote or difficult outdoor locations, the new Profoto Pro-B3 750 is a battery-powered flash Monobloc with a more powerful maximum flash output of 750 joules. Profoto is calling it "the ultimate on-location flash for adventurous photographers". As with the previous B series models, the Pro-B3 has a rugged GRP casing with an integrated handle and an integrated reflector. However, this model also has a tough rubberised coating to provide better weather protection.

Flash power can be adjusted over a range of 11 stops, giving a minimum output of just 0.8 joules and flashing durations can be as short as 1/75,000 for capturing high-speed action. There's the choice of Eco, Boost and Freeze operating modes to balance the requirements of very fast flash speeds, extended battery life and the longevity of componentry such as the flash tube (which, incidentally, is user replaceable).

Recycling times range between 0.02 to 2.2 seconds and the monobloc's high-capacity lithium-ion battery pack can deliver up to 250 full-power flashes or up to one hour of continuous running with the LED modelling lamp. This is a 56-watt LED source balanced at 5600 degrees Kelvin and with a maximum brightness of 6300 lumen. The built-in reflector gives a beam angle of 65 degrees and a field angle of 106 degrees. The unit is also compatible with a wide variety of Profoto's OCF light shapers and accessories. The working aperture with the built-in reflector is f/22.6 (at two metres and ISO 100) and f32.9 when fitted with the optional OCF Magnum reflector.

There are a variety of control and syncing options including Profoto's AirTTL remote triggers which are available to support the flash exposure control systems of Canon, Nikon, Fujifilm, Olympus and Sony mirrorless cameras. Additionally, the Pro-B3 can be wirelessly controlled from a smartphone via Profoto's AirX connectivity and using the Profoto iPhone app. The Air Remote TTL triggers also enable remote adjustment of various settings, including flash power, modelling lamp operation and switching between first/second curtain sync. The Pro-B3 also has Profoto's High Speed Sync (HSS) which enables shooting with flash at shutter speeds of up to 1/8000 second.

The Profoto Pro-B3 is available locally now priced at $6490 which includes the battery and charger along with a carry case. There is also a two-light 'Duo' kit available and priced at $12,870. Profoto products are distributed in Australia by C.R. Kennedy & Co., and for more information visit **www.crkimaging.com.au**

Profoto
7 6 5 4 3 2 1

OM SYSTEM
M.ZUIKO DIGITAL
25mm 1:1.8
OM-3

# OM SYSTEM GOES FULL-ON RETRO WITH THE NEW OM-3

**THE HERITAGE OF** the 35mm OM series 35mm SLRs has informed much of the design thinking behind the Olympus DSLRs and mirrorless cameras over the last two decades or so, reprising in various ways the great Yoshihisa Maitani's keep-it-small philosophy. But it's the post-Olympus OM Digital Solutions that has perhaps got the closest to the ideal of a 'digital OM' with the new OM-3 which is the perhaps the most classically-styled mirrorless camera we've seen so far, even going without a handgrip to maintain dimensions very close to those of the original OM-1. Compared in silhouette, the new OM-3 is only very marginally wider and taller than the 35mm SLR which changed the world in 1972. Of course, there was a 35mm OM-3 (1983) as well and which was intended as the mechanical and fully-manual replacement for the OM-1.

While Fujifilm's X-T series mirrorless cameras still have a more traditional control layout, the OM System OM-3's cleaner and crisper lines overall really echo 35mm SLR styling from the 1970s. Unlike, the OM-5, it's a clean-sheet design – although it has the OM-D era control wheel arrangement – and, under the skin, it's essentially the OM-1 Mark II with the same 20 megapixels stacked BSI-type sensor and the 'TruePic X' generation processor. The all-metal bodyshell is weather-sealed to the IP53 standard with insulation for sub-zero shooting and, despite the more compact size, it still uses the higher-capacity BLX-1 battery pack from the OM-1 models. However, there's only a single card slot – for SD with UHS-II speed support – and the EVF is the lower-res OLED panel from the OM-5.

As with the OM-1 II, the "computational photography" functions – as OMDS calls them – include the live graduated neutral density (ND) filter effects which can be positioned and angled as desired with the choice of a hard, medium or soft edge and an ND 2, 4 or 8 density. The standard live ND function has settings up to ND 128 which represents an exposure reduction of seven stops. The other computational modes include focus stacking, multi-shot HDR capture and 'High Res Shot'. There's now a 'CP' button which enables faster access to these functions via the touch screen. The pixel-shifted 'High Res Shot' has the option to capture 14-bit RAW files – as well as 12-bit previously – at 80 megapixels in the tripod mode and 50 megapixels in the handheld mode.

IBIS is also squeezed in with five-axis movements and correction up to 6.5 stops by itself and up to 7.5 stops with the lenses that support 'Sync I.S.'

The AI-based subject-detection autofocusing recognises humans, animals, birds, aircraft, trains and cars (including motorcycles) and can track up to eight subjects in the frame. The on-sensor phase-detection AF uses the 'Cross Quad Pixel AF' technology and operates across the entire frame. Continuous shooting is possible at up to 50 fps with full AF, AE and WB adjustment, or at up to 120 fps with these measurements locked to the first frame. 'ProCapture' pre-release frame buffering is available with a choice of three modes operating at up to 20, 50 or 120 fps.

Also largely unchanged from the OM-1 II are the OM-3's video capabilities with 4K DCI and UHD recording internally at up to 50/60 fps and Full HD at up to 200/240 fps. There's 10-bit 4:2:2 colour when using OM-Log and HLG (HDR) recording. There's the option of either the H.264 or H265 codecs plus a 12-bit 4:4:4 Apple ProRes RAW output is available for 4K external recording via HDMI to a supporting Atomos Ninja series recorder. Additionally, video can be recorded in the vertical format for replaying on smartphone. With a supporting external microphone, sound can be recorded at the 24-bit resolution with 96 kHz sampling.

The OM System OM-3 is priced at $3199 body only and $3799 packaged with the M.Zuiko 12-45mm f/4.0 PRO zoom lens. Available in Australia now. For more information visit **https://explore.omsystem.com/au/en/** Alternatively, turn to our full test in this issue.

OM SYSTEM 25mm 1:1.8 II MSC
0.25m/0.82ft-∞ SPLASH PROOF
S&Q
ON
OFF
Fn
S
M
B
C1
C2
C3
C4
C5
P
A

A Southern stingray patrols a healthy seagrass meadow. © Remuna Beca 2025

# PHOTOGRAPHY EXHIBITIONS & EVENTS

**Current to 2 March:** Exhibition. *Carol Jerrems: Portraits.* A major exhibition of one of Australia's most influential photographers during the 1970s, and featuring Jerrems's intimate portraits of friends, lovers and artistic peers. At the National Portrait Gallery, King Edward Terrace, Parkes, Canberra, ACT 2600. Entry is $20 with concessions available, book online. Gallery hours are 10.00am to 5.00pm daily. For more information visit **www.portrait.gov.au**

**Current to 27 April:** Exhibition. *Ocean Photographer Of The Year.* Featuring 118 extraordinary images, this exhibition celebrates the vision of talented photographers from around the world. At the Australian National Maritime Museum, 2 Murray Street, Darling Harbour, Sydney, NSW 2000. Entry fee is $35 for adults, with concessions for children under 15 (and an $89 group fee for families), book online. Museum hours are 10.00am to 4.00pm daily. For more information and bookings visit **www.sea.museum/whats-on/exhibitions**

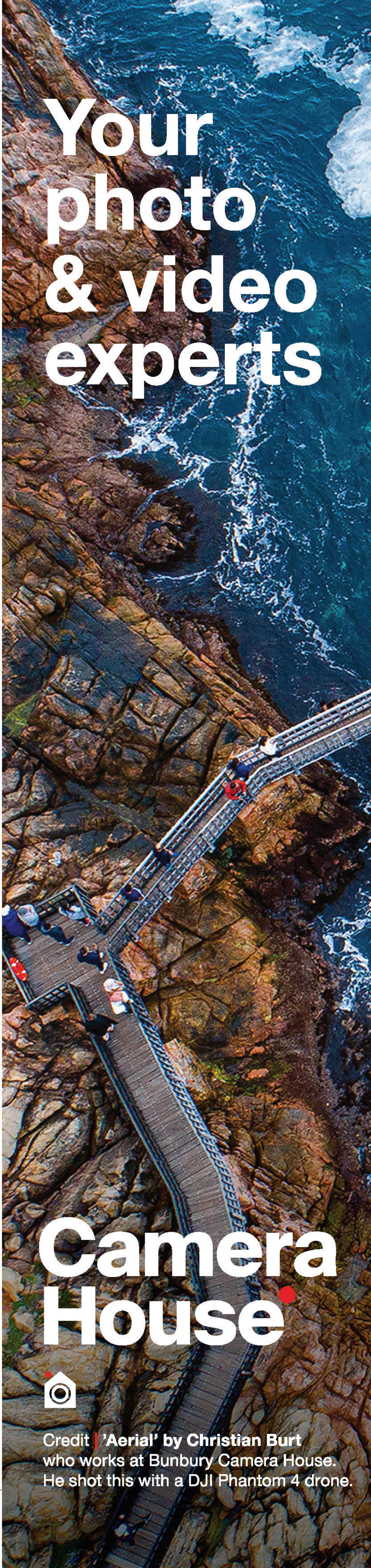
**Current to 27 April:** Exhibition. *Nikon-Walkley Press Photography Awards 2024.* Showcases the finalists in the 2024 Walkley Awards For Excellence In Photojournalism. At the Exhibition Galleries, State Library Of NSW, 1 Shakespeare Place, Sydney, NSW 2000. Entry is free. Exhibition hours are 9.00am to 8.00pm Monday to Thursday, 9.00am to 5.00pm on Friday, 10.00am to 5.00pm on weekends. For more information visit **www.sl.nsw.gov.au**

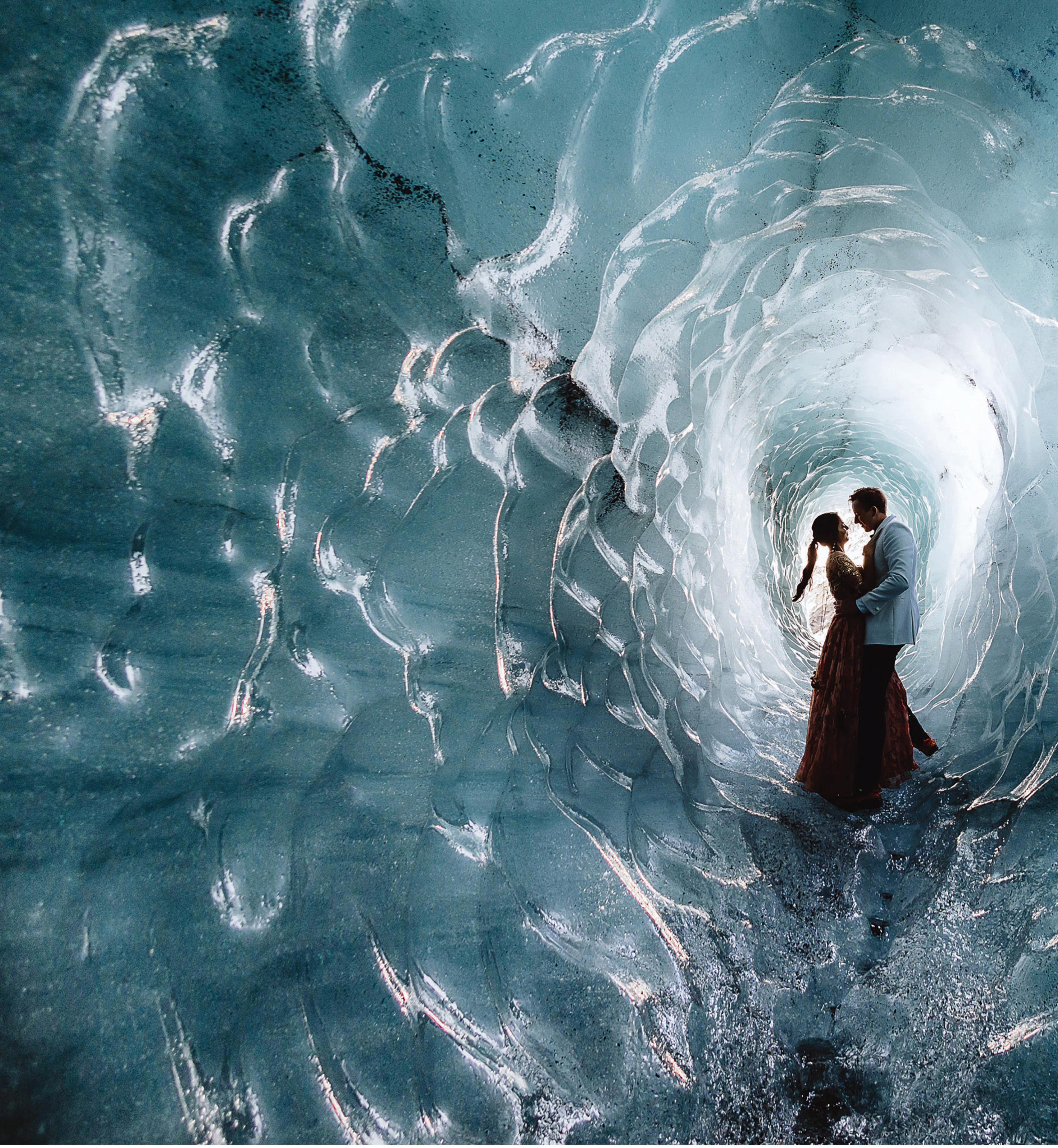
**Current to 1 June:** Exhibition. *If Only We Could Take The Time: Contemporary Australian Photography.* This exhibition considers how the impulse to observe, to record and to share continues to propel photographic practice in Australia today. Works by Ying Ang, Katrin Koenning and Anu Kumar. Entry is free. Gallery hours are 10.00am to 5.00pm daily. For more information visit **www.portrait.gov.au**

**Current to 1 July:** Exhibition. *Student Life: Max Dupain At The University Of Sydney.* Max Dupain (1911-1992) documented student life at the University in the early 1950s creating a brilliant and frequently hilarious series of candid photographs. At the Chau Chak Wing Museum, University Place, University Of Sydney, Camperdown, NSW 2006. Entry is free. Museum hours are 10.00am to 5.00pm ion weekdays and 12.00pm to 4.00pm on weekends. For more information visit **whatson.cityofsydney.nsw.gov.au/events/**

**Current to 13 July:** Exhibition. *New Light: Photography Now + Then.* An exhibition where past and present converge in a mesmerising display of photography spanning 1890 to 2024, including works by Brisbane photographer Alfred Henrie Elliott (1870-1954). At the Museum Of Brisbane, Level 3, Brisbane City Hall, King George Square, Brisbane, Queensland 4000. Entry is free. Exhibition hours are 10.00am to 5.00pm daily. Closed Good Friday (29 March). For more information visit **www.museumofbrisbane.com.au**

**Current to 31 December:** Exhibition. *PIX: The Magazine That Changed Everything.* PIX was Australia's first pictorial news weekly and hit newsstands in January 1938. It delivered a new style of journalism, using photographs to tell daring stories of modern life. At the Photography Gallery, State Library Of NSW, 1 Shakespeare Place, Sydney, NSW 2000. Entry is free. Exhibition hours are 9.00am to 8.00pm Monday to Thursday, 9.00am to 5.00pm on Friday, 10.00am to 5.00pm on weekends. For more information visit **www.sl.nsw.gov.au**


Your photo & video experts
Camera House
Credit | 'Aerial' by Christian Burt who works at Bunbury Camera House. He shot this with a DJI Phantom 4 drone.



Photograph by Bettina Vass, Iceland, and the 8th International Wedding Photographer Of The Year, copyright 2024.

## The Picture

Photographed inside the Katla Ice Cave in Iceland, this image is the winner of the 8th International Wedding Photographer Of The Year competition and beat over 2000 other entries submitted by 450 photographers from a total of 63 countries. Started in 2017 and based in Adelaide, the IWPOTY competition is open to both amateurs and professionals,

**Presented by** ILFORD **www.ilford.com**
**Ph: (03) 9823 1555**
**for more information**

and dedicated to the promotion of the art of wedding photography and the celebration of diversity across the globe.

## The Photographer

Born in Hungary, Bettina Vass is an award-winning elopement and wedding photographer now based in Reykjavik, Iceland. She specialises in photographing adventurous couples in the many challenging locations that can be found in 'the land of fire and ice'.

"Iceland is an exciting place to get married since you never know what's next," she says. "We could start the day with blowing snow, and end it chasing rainbows next to sun-soaked waterfalls.

"My approach to photography is centred on capturing relationships, friendship, nostalgia, memories and personality… rather than technicality and posing. I strive to help my clients have fun and forget about the world as they explore a new, epic landscape."

## The Story

Bettina tells the story behind her winning photograph.

"As a photographer, I have had the privilege of capturing some of the most unique and breathtaking moments in people's lives. But when Mauli and Christian reached out to me with their idea of getting married on top of a glacier in Iceland, I knew this was going to be something truly special. The Katla IceCcave, nestled in the stunning surroundings of Vik on the south coast of Iceland, is a place like no other. Named after the volcano beneath the Kötlujökull glacier, this ice cave is a sight to behold. To reach it, you must embark on a hike and descent led by a trained glacier guide. After their photos in the ice cave, we hiked to the top of the glacier where Mauli and Christian exchanged their vows against the backdrop of the setting sun, it was a moment of pure joy and beauty"

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To see all the winners and finalists in the 8th International Wedding Photographer Of The Year competition go to **https://iwpoty.com**

To see more of Bettina's photography go to **https://bettinavass.com**

ILFORD
BLACK & WHITE
ILFORD
GALERIE
PROFESSIONAL INKJET PHOTO RANGE
ILFORD
AUTHORISED
PHOTO
RESELLER

OM SYSTEM
OM-3
OLYMPUS 12-45 mm 1:4 PRO
OLYMPUS LENS HOOD LH-61G

## OM SYSTEM OM-3

# IF LOOKS COULD THRILL

**All the tastiest features of the OM-1 Mark II packed into a more compact body which is also more overtly classically styled. The new OM-3 is OM System's boldest statement – post-Olympus – yet and, consequently, also its most desirable.**

REPORT BY **PAUL BURROWS**

OM SYSTEM
OM-3

▲ Look Mum, no handgrip. Will you miss it? Nope. After all, we survived for a very long time just holding onto to the body of a 35mm SLR… and it's still the case with Leica's digital RF cameras. Handling comfort certainly isn't compromised at all.

What do you first notice about the OM System OM-3? It takes a little while to take in that you're looking at the clean and uncluttered lines that were once a staple of 35mm SLR design before ever-bulkier handgrips became a thing. Yup, the OM-3 doesn't have one at all… not even a little bump like on the Nikon Zf. There's a thumbgrip at the back, but from the front it's all about the balanced, elegant proportions that made the original OM-1 – and its OM-2 semi-auto exposure sibling – such a hit back in the 1970s. Of course, there was also an OM-3 in the original dynasty (see the breakout panel), so OM Digital Solutions is going the full classical OM camera experience with this new model… although the 35mm SLR from 1983 was fully manual (and mechanical) while its 2025 namesake packs in a load of contemporary mirrorless camera tech. In fact, inside its pretty, slimline body, the OM-3 has pretty much the full suite of OM-1 Mark II features and capabilities; including all the 'Computational Photography' functions, the 'Cross Quad Pixel AF' system and continuous shooting at full res up to 120 fps.

OK, so as somebody famous once said, you can't have everything… so what's the catch? Well, depending on what you might consider really important in a modern mirrorless camera, there may not be any; but the key differences with the OM-1 II are a single memory card slot and a lower-res EVF (2.36 megadots versus 5.76). Given the OM-3's many other attractions, neither of these are necessarily deal-breakers. Consider the OM-1 II to be the workhorse and the OM-3 to be the showjumper… pleasing to look at, but still capable of performing.

## STACKED UP

As with the OM-1 models, the sensor is a stacked BSI-CMOS with an effective pixel count of 20.4 million and a native sensitivity range equivalent to ISO 200-25,600 with extensions either side; down to ISO 80 and up to 102,400. The stacked design delivers a number of performance benefits; most notably a faster read-out speed, an improved dynamic range and lower noise levels.

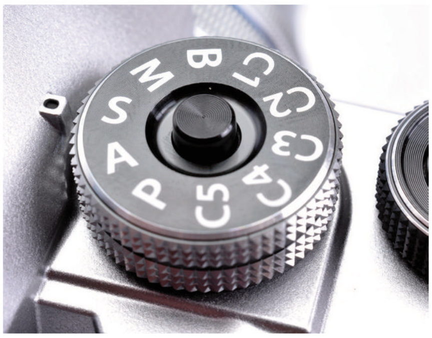
The maximum image size is 5184x3888 pixels for both JPEGs and RAW files with a choice of four smaller sizes and three compression levels for the former. There also choice of five aspect ratios – 4:3, 3:2, 16:9, 1:1 and 3:4 – while RAW capture is with 12-bit colour and lossless compression. There's still no 10-bit HEIF capture option and 14-bit RAW files are only available when using the multi-shot High-Res function.

As noted in the introduction, the sensor also incorporates OMDS's 'Cross Quad Pixel AF' technology so, under each pixel point, are four photodiodes rather than one and these collectively – by making comparisons between each's read-out – can determine depth and hence distance. This enables phase-difference detection AF measurements to be made across the entire frame.

The four-photodiode groupings at each pixel point serve as X-shaped detectors so they can measure in both the horizontal and vertical planes. There are 1053 selectable points with a bunch of area modes, either preset or customisable. The former comprise, in diminishing size; All, Large, Medium, Cross, Small and Single. Additionally, you can create up to four custom AF area settings which can be either square or rectangular and at any size, plus the number of active points can adjusted to vary the selectivity. You can then select which area modes you want to be available on-demand when you're shooting… all of them (including the custom-made sizes) or just one or two for quicker switching between them.

Also shared with the OM-1 models is the current-gen 'TruePic X' high-speed processor which enables continuous shooting at up to 50 fps with full AF, AE and WB adjustment, or at up to 120 fps with these measurements locked to the first frame. However, as before, you'll need an M.Zuiko Digital lens that supports the 50 fps AF adjustment speed (still at six models, all

▲ New dial switches between the photo and video modes and the latter's 'Slow & Quick' variable frame rates for slow motion or fast motion effects.



▲ Main mode dial can be locked at its settings. The four 'C' positions are for custom camera set-ups.

▲ The OM-3 uses the same higher-capacity battery as the OM-1 models.

OM SYSTEM 25mm 1:1.8 II MSC
0.25m/0.82ft-∞
SPLASH PROOF
S&Q
ON
OFF
P
A
S
M
B
C1
C2
C3
C4
C5
Fn

PRO series). The 'ProCapture' pre-release frame buffering is also available with a choice of three modes operating at up to 20, 50 or 120 fps and with the option of specifying the number of pre-capture frames (up to a maximum of 70).

Sensor-shifting provides in-body image stabilisation, delivering up to 6.5 stops of correction by itself and up to 7.5 stops with 'Sync IS' – which combines OIS and IBIS. The smaller bodyshell probably accounts for the slight reduced range compared to the OM-1s.

Pixel-shifting drives the OM-3's multi-shot 'High-Res Shot' mode which delivers 80 megapixels – with the choice of 12/14-bit RAWs or JPEGs – when the camera is mounted on a tripod, and 50 megapixels when shooting hand-held. Eight shifted frames are captured and combined in-camera with the resulting image also exhibiting a two-stop reduction in noise.

## ON THE BUTTON

As noted earlier, there's a whole swag of multi-shot in-camera compositing functions which are bundled together under the title of 'Computational Modes'. They have their own menu page, but the OM-3 introduces a 'Computational Photography' button for speedier access in conjunction with the rear input wheel. This brings up a ribbon menu along the lower edge of the monitor screen which displays all the possible setting options, although in some cases various things need to be preset via the main menu.

The OM-3's CP line-up is the same as the OM-1 II's, starting with 'Live ND' with settings up to ND128 setting which represents a seven-stop reduction in exposure. Unlike with a conventional neutral density filter, 'Live ND' allows you to *effectively* increase the exposure time without needing to slower shutter speeds and a tripod… and there's no need to use small apertures either. It works by capturing a progressively greater number of short exposures – depending on the 'Live ND' setting – which has the effect of creating the motion blur normally produced a single long exposure. Because image stabilisation is again operating continuously (and each of the multiple exposures is short), you can still shoot handheld… even when the 'effective' exposure time equates to one second.

The 'Live GND' function – digital graduated ND filter effects – was introduced with the OM-1 II and there's the choice of ND 2, 4 or 8 density settings (i.e. one, two or three stops) along with hard, medium or soft transitions. You can set the graduated section's position via the monitor's touch screen or, when using the viewfinder, by using the navigational controls to shift up or down. These also allow you to shift the pivot point for the angle adjustment which is subsequently performed via the front and rear input wheels (either coarsely or finely respectively).

The 'Computational Modes' also includes focus stacking – again with the images processed in-camera – a selection of HDR modes, and a double exposure facility. The focus stacking can be set for up to 15 frames with the focus adjustment step ranging from one to ten. There are two auto HDR modes – which capture four frames to give either "high contrast" or "super-high contrast" effects – or it can be set manually to make +/-2.0 EV adjustments over three, five or seven frames; or +/-3.0 EV variations over either three or five frames. This delivers either a composited JPEG or a set of RAW files ready for post-camera processing.

In the same menu – but listed under the 'Other Shooting Functions' tab – is the 'Live Composite' function that has been on every Olympus OM-D and OM System camera and is designed for low-light photography. It combines a reference background exposure with subsequent multiple exposures that only add any bright light sources (such as stars) thereby avoiding any overexposure. It can run for up to six hours, and the 'Live' reference means that it can be monitored in real-time in the monitor or the EVF; likewise also the other 'Live Bulb/Time' shooting modes. Image stabilisation is available with 'Live Composite' shooting so you can also use it hand-held, but obviously only with shorter exposure durations.

## FACE TIME

Returning to the OM-3's AF system: sensibly, OMDS includes the mode for recognising humans in the main 'Subject Detection' menu rather than separately. The recognition extends beyond eyes and faces to also heads and bodies so it can stay

▼ Rear panel layout keeps it simple.

CP
AF-ON
MENU
INFO
OK

ART
COLOR
MONO

▲ The 'Creative Dial' makes a comeback (last seen on the Olympus PEN-F from 2016) and provides direct access to the OM-3's new film-based profiles as well as the special effects filters and 'Colour Creator' adjustments.

▲ New 'CP' button provides quick access to the OM-3's 'Computational Mode' multi-shot modes via touch tile in the monitor screen.

locked on in many more situations (such as when the subject turns away from the camera or the face is partially obscured). The other modes are for cars and motorcycles, aircraft (which includes helicopters), trains, animals and birds, but there's no automatic 'catch-all' subject detection.

Low-light AF sensitivity extends down to EV -5.5 at ISO 100 and f/2.8 and down to EV -8.0 with the 17mm, 25mm or 45mm f/1.2-speed PRO series M.Zuiko Digital primes. There's also the 'Starry Sky AF' mode which was first introduced with the E-M1 III and uses a dedicated control algorithm to accurately autofocus on extremely small points of light. Here there's also the choice of Speed Priority or Accuracy Priority, and the mode is activated by pressing the 'AF On' button. Once focus is achieved (which can take a few seconds with Accuracy Priority), it will stay locked on until you either switch off the function or the camera.

The manual focusing assists are comprise a magnified image (up to 14x) and/or a focus peaking display which can be set to red, yellow, black or white; and at low, normal or high intensity. There's also a 'Focus Indicator' display which shows the direction – and the amount – of rotation of the focusing collar required to achieve sharp focus.

The OM-3's exposure control system is again based on the 324-zone 'Digital ESP' metering that's used in all the current OM System models (and OM-D before). The alternatives are centre-weighted average and spot measurements, the latter with the added choice of a bias for either the highlights or the shadows which is a feature Olympus first introduced on the OM-4 way back in 1983.

> CONSIDER THE OM-1 II TO BE THE WORKHORSE AND THE OM-3 TO BE THE SHOWJUMPER... PLEASING TO LOOK AT, BUT STILL CAPABLE OF PERFORMING."

The standard 'PASM' exposure control modes are supplemented by an AE lock, up to +/-5.0 EV of compensation and auto bracketing which can be applied over sequences of two, three or five frames with adjustments of up to +/-1.0 EV, or over seven frames with a variation of up to +/-0.7 EV. There is also bracketing for flash, sensitivity, white balance, the 'Art Filters' effects and focus. The focus bracketing can be programmed for sequences of up to 999 shots with a choice of ten focus adjustment steps from narrow to wide. However, unlike with the focus stacking functions, these frames have to be combined post-camera.

The camera's focal plane shutter has a speed range of 60-1/8000 second with flash sync up 1/250 second. The sensor shutter has a speed range of 60-1/32,000 second with the faster sensor read-out allowing for flash sync up to 1/100 second (at up to ISO 12,800, 1/50 second from ISO 16,000 and higher). The hybrid 'electronic first curtain shutter' has a top speed of 1/320 second.

The white balance control options comprise two auto modes (the second being the 'Keep Warm Colour' variation), seven lighting type presets (including one for shooting underwater) and provisions for storing up to four custom measurements. All have fine-tuning and manual colour temperatures can be selected over a range of 2000 to 14,000 degrees Kelvin.

## ON THE DIAL

The OM-3's in-camera processing options for JPEGs expand to include what are essentially Fujifilm-style film simulation profiles – four for colour and four for B&W. These are included in the 'Picture Mode Settings' in the main shooting menu, but are also accessible via another new external control called the 'Creative Dial' which can also be used to select the 'Art Filter' special effects and the OM-3's 'Colour Creator' function. Well, the 'Creative Dial' isn't actually entirely new because it was also a feature of the PEN-F from 2016, but then Olympus didn't subsequently add it to any of the OM-D series models.

Now, of course, film-based profiles are becoming trendy – even though Fujifilm has been promoting them forever – but even more so is the idea of making them more readily accessible via an on-camera control

## MAKING MOVIES

**With its clearly photographic heritage,** the OM-3 doesn't look like an obvious choice as a video camera, but as with its photographic capabilities, it inherits the most of the video feature set from the OM-1 Mark II as well. Again, the practical limitations versus the latter aren't significant and topped by the single card slot which obviously prohibits proxy recording or back-ups.

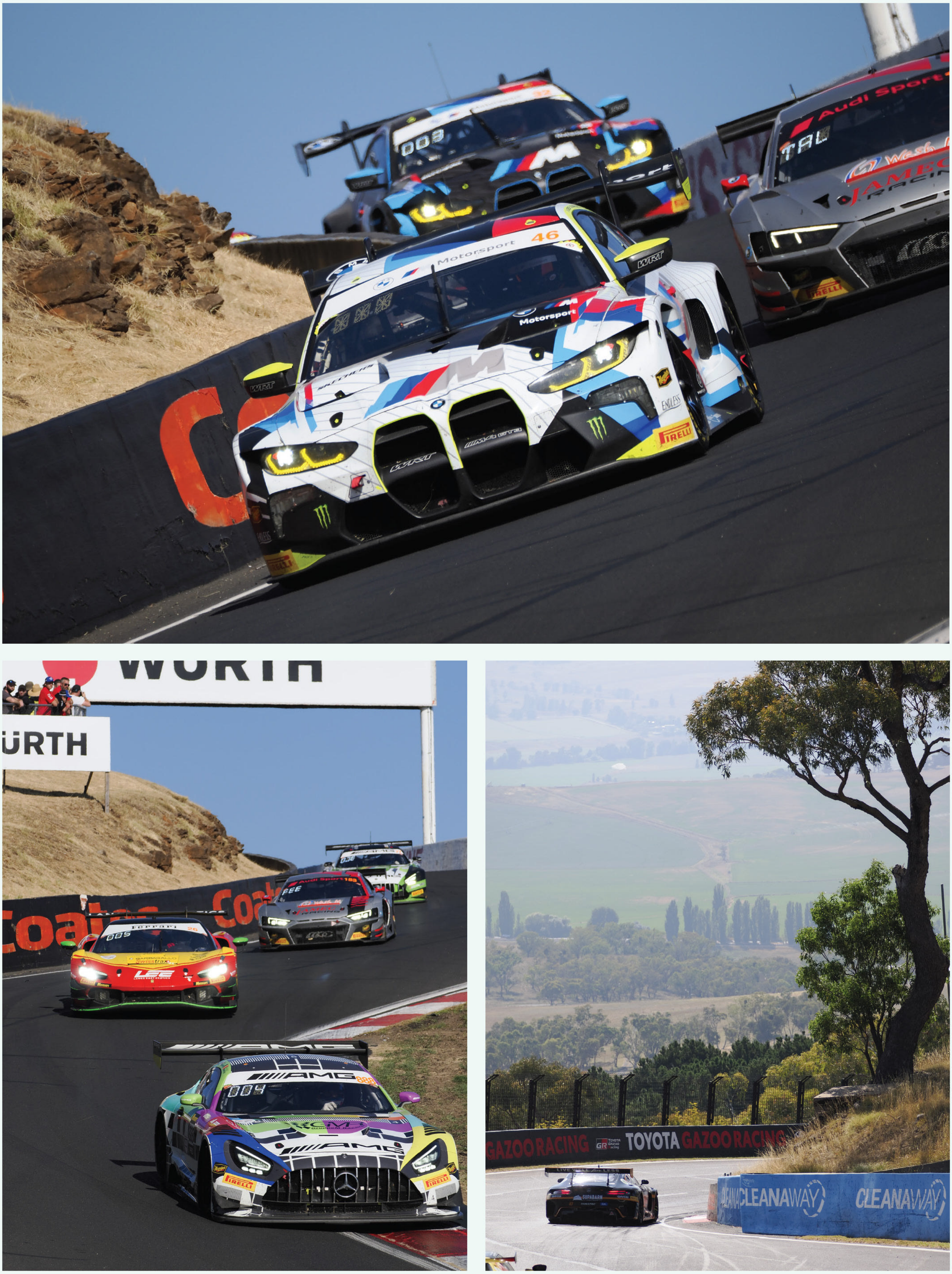
Both 4K DCI and 4K UHD can be recorded internally at 50 or 60 fps, and Full HD shooting is available up to 200/240 fps for slow-motion clips (in the 'S&Q' mode). There's the option of 10-bit 4:2:0 colour with the H.265 HEVC compression codec which delivers bit rates of up to 152 Mbps. With the standard MPEG-4 AVC H.264 codec and 8-bit 4:2:0 colour, the bit rates extend up to 202 Mbps. The LongGOP interframe compression regime is applied to 4K recording, but there's the option of ALL-I intraframe compression with FHD at 24, 25 or 30 fps which boosts the maximum bit rate up to 202 Mbps. There are an additional two video picture modes called Cine1 and Cine2 which join the Flat, OM-Log400 and HLG (HDR) profiles. Usefully, 'View Assist' is available which gives a BT.709 colour display so you can get an idea what the 10-bit Log and HDR footage will look like. There's no limit on clip durations beyond, of course, those imposed by memory card capacity, battery life or high camera temperatures.

The external recording options are topped by a 12-bit 4:4:4 colour ProRes RAW output in 4K DCI or 4K UHD up to 60 fps which is supported by the Atamos Ninja V and V+ devices (via a firmware upgrade). However, the OM-3 sticks with the smaller HDMI Type D connector.

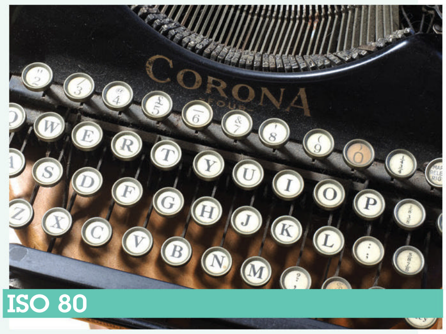
There's the option of recording high-quality sound with 24-bit quantisation and sampling at 96 kHz. There's both a stereo audio input (with switchable plug-in power) and a stereo audio output for connecting headphones. Both are the standard 3.5 mm stereo minijack connections. Sound levels are adjustable manually and there's a built-in attenuator for shooting in very noisy locations. A wind-cut filter can be set to Low, Standard or High. It's also possible to adjust the audio levels sent to the headphones. Additional electronic image stabilisation is available when shooting video and enables remarkably smooth hand-held shooting, but it results in a small crop of 1.18x because the image is shifted on the sensor.

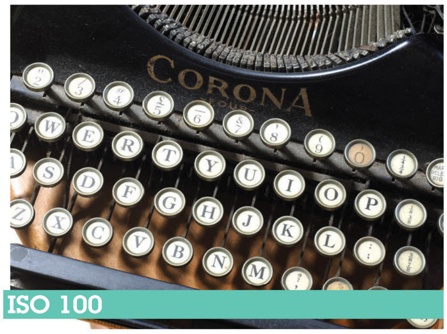
The rest of the video functionality includes time-coding, two zebra patterns with adjustable thresholds, the 'PASM' exposure modes, the 'Picture Mode' profiles, most of the 'Art Filter' effects, lens vignetting correction, the grid guides, the real-time histogram display and the focus peaking display. Touch screen controls are available for AF point selection, pull focusing, exposure adjustments (apertures, shutter speeds and compensation), audio recording levels, headphone levels and power zooming.

As is the case with the OM-1 Mark II, a number of higher-end video capabilities are missing so there are better options for serious video-makers – notably the Panasonic Lumix GH7 – but the OM-3 has the technical and creative capabilities to satisfy the requirements of photographers who also want to shoot high-quality clips.


Motorsport
46
WRT
Audi Sport
WÜRTH
ÜRTH
AMG
TOYOTA GAZOO RACING
CLEANAWAY

▲The OM-3 probably wouldn't be an obvious choice of a sports camera, but it can certainly do the job, having all the same capabilities as the OM-1 Mark II. This event was the 2025 Meguiar's Bathurst 12 Hour endurance race. Test images captured as JPEG/large/super fine files using the M.Zuiko Digital ED 100-400mm f/5.0-6.3 IS zoom lens. Vivid 'Picture Mode', shutter-priority auto exposure control and ISO settings between 200 and 1600. Out-of-the-camera JPEGs exhibit excellent detailing, nicely smooth tonal gradations and a wide dynamic range.


ISO 80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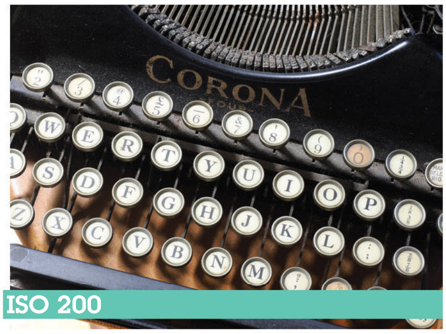
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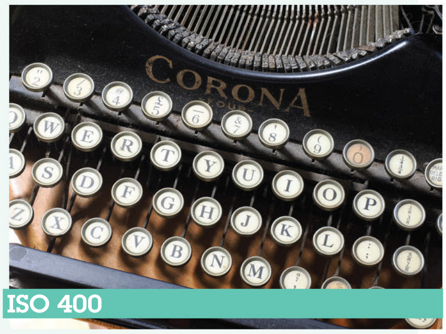
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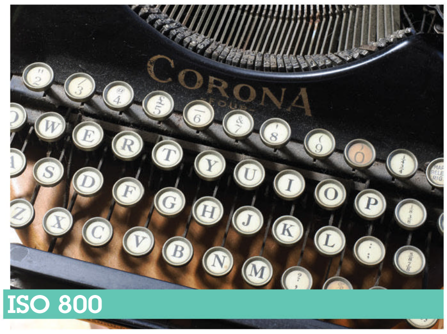
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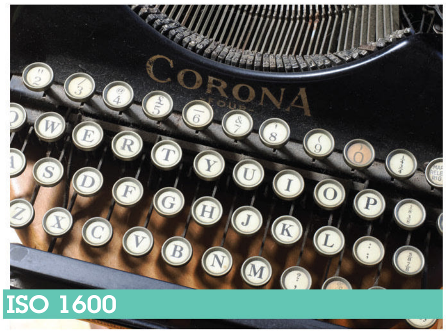
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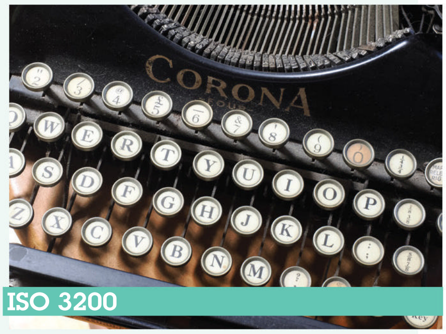
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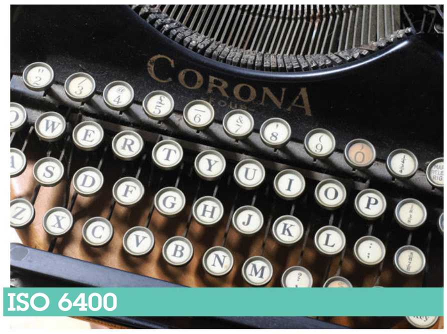
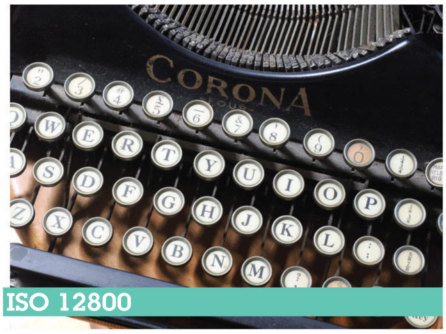

ISO 6400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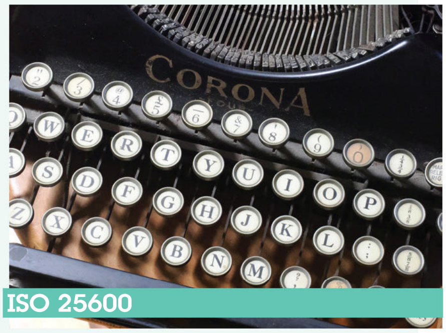
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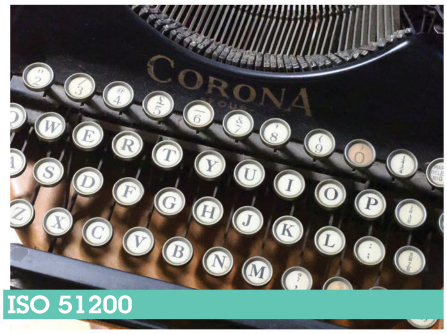
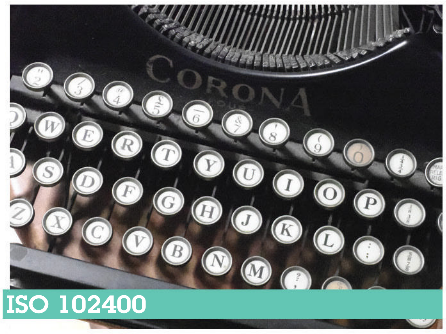

ISO 51200


ISO 102400

▲The OM-3 has the same performance characteristics across its sensitivity range as the OM-1 Mark II so the full native ISO range is usable, with only a minimal loss of sharpness and saturation at the very highest settings. Even the one-stop push to ISO 51,200 holds up pretty well in terms of image quality. However, the colour saturation starts to progressively decline over the extension settings. These test images are JPEG/large/super fine files taken in the aperture-priority auto exposure mode with the aperture set to f/11 so the exposure time varies to compensate for the ISO adjustments. Noise reduction and noise filter are switched off. Olympus M.Zuiko Digital 12-40mm f/2.8 PRO.

as per the Fujifilm X-T50 and the X-M5. The 'Creative Dial' was ready for a comeback and film-based profiles obviously fit right in with the OM-3's whole retro design ethos.

The OM-3's four colour profiles are labelled Standard/Natural, Chrome Film Rich Colour, Chrome Film Vivid and Chrome Film Soft Tone. The monochrome offerings are Standard, Classic Film B&W, Classic Film IR and Classic Film Low Contrast. Like the camera's standard 'Picture Modes', the profiles can be tweaked and tuned, including a 'Film Grain Effect' adjustment for the B&W options and the 'Colour Creator' wheel for the colour one. Both also have the 'Highlight & Shadow Control' which works like Photoshop's Curves to adjust the highlights, shadows, and mid-tones. The 'Colour Creator' – which has been an Olympus/OM System staple for quite a while – is similar to Photoshop's Saturation/Hue adjustment and you're guided by a colour wheel. As before, there's a choice of eight 'Picture Mode' presets and 16 'Art Filter' special effects which, if you count all the possible variations for these, expands this list of settings to 31. To this you can also add the camera's 'Colour Creator' function and the eight film profiles with all available to be included in the 'Art Filter' bracketing. So, should you desire it, you could have a total of 48 different versions of an image.

As with the OM-1 II, the OM-3's flicker detection and correction capability includes a 'Flicker Scan' function for shooting under high-frequency LED lighting (now becoming common in indoor sports venues). After determining the switching frequency of the lighting source, the camera adjusts the shutter speed slightly to avoid banding in the image taken during the 'off' phase. The various other corrective measures comprise 'Shading Compensation' to reduce vignetting, noise reduction for both high ISO settings and long exposures, 'Keystone Compensation' which provides in-camera perspective control (in both the vertical and horizontal planes) and 'Fisheye Compensation' which offers three settings for correcting the extreme distortion when shooting with the M.Zuiko Digital ED 8mm f/1.8 Fisheye PRO lens. At the other end of the focal length range, when making long exposures and/or using telephoto lenses, there's an 'Anti Shock' mode which switches the camera to the 'electronic first curtain shutter' operation and allows for a delay time to be set (between 1/8 second and 30 seconds) to allow any physical vibrations to dissipate before the exposure commences.

## IN THE HAND

Once you've stopped admiring just how nice it looks, the big test with the OM-3 is how does it feel? Comfortable enough to make you wonder what is all the fuss about handgrips, and this doesn't appear to diminish over time or when a longer and heavier lens is fitted. Inevitably, there'll be an accessory grip from either OMDS itself or a third-party maker, but it really doesn't need one. Incidentally, similar to Nikon's Zf, there aren't any connections for fitting a vertical/battery grip. While there's only a single memory card slot, it does have its own compartment on the side of the camera and isn't bunked in with the battery so it's always accessible.

The press presentation for the OM-3 showed it silhouetted behind the original OM-1 and there's not much in it beyond the new camera being a little wider in order to accommodate the full-fat BLX-1 battery pack (mainly needed to power all those in-camera processing functions). The bare body weight is 413 grams which is nearly 100 grams lighter than the OM-1 II, but the OM-3 still feels very well-built with a good amount of heft. The construction is all-metal with weather protection to the IP53 standard and insulation to allow operation in subzero temperatures down to -10 degrees Celsius.

The basic control layout comprises a lockable main mode dial along with front and rear input wheels which are dial-like in their design and in a similar arrangement to the OM-5. However, unlike on that model, there are no dedicated buttons for the essentials of ISO and exposure compensation so you'll have to customise if you want these at your fingertips. A smaller dial switches between the photo and video modes and also the latter's 'Slow & Quick' framing speeds. The on/off switch is on its own and, frankly, a bit on the small side, but you'll get used to it.

The rear panel layout is also straightforward with the main control being a four-way navigator and keypad. These keys are customisable as are a dedicated 'Fn' function button and another four buttons which have pre-assigned duties. The input wheels' operation can also be customised within the scope of exposure control settings. Additionally, these can be easily switched between different functions via an 'Fn Lever' (which is also customisable). As we noted with the OM-5, OMDS doesn't go over-the-top with the customisation options, but there's enough to set the camera up to suit personal preferences. Additionally, the customisable 'My Menu' can be assigned up to 35 items over five pages.

Crucially – and unlike the OM-5 – the OM-3 has the much-improved menu system that was introduced with the first of the OM System-era OM-1. Its much more logical layout makes for easier and more efficient navigation. However, there isn't any touch control implementation for the main menu, but the monitor-based 'Super Control Panel' gives fast tap-and-go access to all the key settings. This can be either a standalone display in the monitor or superimposed over the live view image (either monitor or EVF) when it's now called 'Live Control'. The other touch screen operations include focusing point/zone selection – with or without automatic shutter release – and a touchpad facility (which Olympus calls the "AF Targeting Pad") for focus point/zone selection when using the EVF. Touch controls are also available in review/replay for functions such as browsing and zooming.

As already noted, the OM-3's EVF is the 2.36 megadots OLED panel from the OM-5, with a magnification of 0.68x (35mm equivalent) and a refresh rate of 60 fps. These specs looked pretty ordinary a couple of years ago when the OM-5 was released and even more so now, but in practice the OM-3's finder works just fine in terms of definition, colour and contrast. Both the EVF and the monitor are adjustable for

> **IT'S EXTREMELY UNLIKELY THAT YOU'LL LOOK AT THE BEST-QUALITY JPEGS – STRAIGHT OUT OF THE OM-3 –AND COMPLAIN ABOUT THE DEFINITION, DETAILING, TONALITY OR DYNAMIC RANGE."**

SYSTEM
OM-3
OLYMPUS
OM SYSTEM
OM-3

Original OM-3 appeared in 1983 and was the last fully-mechanical Olympus 35mm SLR. Mirrorless-era namesake is just as pretty, but with features that were beyond the imagination 40 years ago.

## HERE'S ONE WE MADE EARLIER

The 'single digit' Olympus OM 35mm SLRs are film camera royalty and while the original OM-1 and the OM-2 tend to get all the accolades, the OM-4 (introduced in 1983) was arguably the most successful model, especially in terms of attracting professional users and appealing to enthusiast-level shooters when Canon and Nikon were starting to sweep all before them. For a while, the OM-4 was standard issue at *National Geographic* magazine, no doubt partially because of its compact size, but also the truly excellent system of Zuiko lenses. The Ti version's titanium bodyshell – which arrived in 1986 – added extra durability to the mix, although all OM-4s were weather-sealed.

However, for the purists there was the OM-3, also launched in 1983 and also available later on with a titanium body. It was designed to take over from the OM-1 as Olympus's fully-mechanical offering (although the former actually remained in production), but it also had the OM-4's pioneering multi-spot metering with the option of biasing for the highlights or the shadows. It could also accept the later OM winders and motordrives with the MD 2 – also a very compact unit for the time – giving 5.0 fps advance and automatic film rewinding.

Through the 1980s, though, the 35mm SLR world was heading towards ever more automation so the OM-3 was never a big seller and its smaller production volumes now add value to its collectability. Today it's arguably the most desirable classic OM 35mm SLR, except perhaps for the few M-1s that escaped before Olympus agreed to add the 'O' to the model designation. Time will tell whether the digital-era OM-3 will also become a classic, but it looks very promising.

▲The arrangement of the front and rear input wheels is one of the few carry-overs from the earlier OM-D era.

brightness and colour balance plus there's a choice of three displays styles for the viewfinder. Two of these essentially replicate the read-outs of a film-era viewfinder (one looking very like the original OM-3 with its white-on-blue display) while the third duplicates the monitor. Additionally, there's a 'Simulated Optical Viewfinder' (S-OVF) display which extends the dynamic range to replicate the look of an optical finder. S-OVF also operates like an optical finder so it also only provides the 'traditional' read-outs (such as exposure settings, etc.). The OM-3 also has a 'Night Vision' mode brightens the live view image so that you can still see what's going on even in close to total darkness.

The monitor is a 7.62 cm LCD TFT panel that's fully-articulated, and has a resolution of 1.037 megadots. While the EVF uses the lower-res OLED panel from the OM-5, the finder's eyepiece uses the high-quality optics from the OM-1 models.

The live view screen can be customised with a real-time histogram, dual-axis level indicators, both highlight and shadow warnings (in orange and blue respectively) and a superimposed grid/frame (selected from a choice of six and adjustable for colour too). The highlight and shadow warnings have adjustable thresholds and the real-time histogram display includes an internal section – shown in green – which shows the brightness values within the selected focusing point or cluster of points.

An 'Anti-Flicker LV' facility reduces the flickering on the live view display when shooting under artificial lighting. It can be set to 50/60 Hz depending on the mains power supply of the country you're in, or to Auto.

The review/replay screens can also be configured to include a thumbnail image with a full set of histograms (i.e. brightness and RGB channels), a larger brightness histogram superimposed over the image, and both the highlight and shadow warnings. Touch controls are available for browsing, zooming and selecting a thumbnail. The in-camera editing functions – for JPEGs obviously – comprise Shadow Adjust (i.e. for dynamic range expansion), Red-Eye Fix, Trim, Aspect, B&W, Sepia, Saturation and Resize, plus there's in-camera RAW-to-JPEG conversion.

The OM-3's interfaces comprise USB Type C, micro HDMI (Type D), a stereo audio input (with switchable plug-in power) and a stereo audio output for connecting headphones. Gone, however, is the PC flash terminal that's available on both the OM-1 models and the OM-5. The wireless connections are WiFi at 2.4 GHz and Bluetooth LE with the OM Image Share (OI.Share) smartphone app also allowing for remote camera control as well as file transfers.

## SPEED AND PERFORMANCE

Loaded with a SanDisk Extreme Pro 64 GB SDXC UHS-II memory card and using the standard silent sequential shooting mode (i.e. using the sensor shutter) set at 20 fps, the OM-3 captured a burst of 175 JPEG/large/fine frames in 8.675 seconds which represents a shooting speed of 20.17 fps. With the SH2 mode set to its maximum speed of 50 fps, a burst of 134 frames was recorded in 2.655 seconds to give 50.47 fps.

While you can still shoot in the super fine JPEG quality mode at these highest speeds, the burst lengths will be smaller than OMDS quotes for the large/fine quality setting because, logically, these files are bigger in size (with our test scene; 13.2 MB versus 9.7 MB). By any measure, however, the OM-3 is a very quick camera – perhaps faster than it probably needs to be – and it's possible that, unlike with the overtly more sports-orientated OM-1 models, some users won't need all the speed so it's good that the frame rates and burst lengths for each drive setting can be reined in to better suit the shooting situation.

The Mark II OM-1 delivered some quite noticeably improvements in its autofocusing performance compared to its predecessor and, of course, these are carried over to the OM-3. The inclusion of humans in the main subject detection submenu just makes life so much easier than when this option is a separate setting. The tracking for faces and people is exceptionally reliable, even when the subject is quite small in the frame or moving erratically. It rapidly switches from face to head to body as required to keep the focus locked on. Additionally, the tracking in the non-subject-specific continuous autofocus (C-AF) mode is also stays tenaciously locked-on with rapid changes of direction or speed.

The OM-1 models have mostly countered the assumptions that the Micro Four Thirds sensor can't hold its own against at least 'APS-C' and, up to a point, even full frame. The stacked design optimises the signal-to-noise ratio, but there have also been improvements to the noise reduction algorithms to further boost the performance at the higher ISO settings. So, once again, the full native ISO range of 200 to 25,600 is useable with the colour saturation and the definition holding up all the way to the highest native settings. Even the one-stop push up to ISO 51,200 still looks clean and sharp, albeit with a small reduction in saturation. Nevertheless, there's still scope for significant enlargement before any softening of the finer details becomes particularly noticeable. The wide dynamic range also enhances the flexibility of the RAW files, giving plenty of scope for post-camera exposure adjustments for the highlights and shadows without compromising the image quality.

The 20 megapixels delivers plenty of well-defined detailing and nicely smooth tonal gradations. With the addition of the film-based profiles there's now even more scope for fine-tuning the look of an image to suit your creative objectives and, while there isn't quite the variety on offer in a Fujifilm camera, there's enough to work with here, especially as you can also make further tweaks.

As we've commented previously, it's extremely unlikely that you'll look at the best-quality JPEGs – straight out of the OM-3 –and complain about the definition, detailing, tonality or dynamic range.

## THE VERDICT

Ever since the first moves into DSLRs (remember the quirky E-330 at all?), Olympus had been trying to realise the objective of a 'digital OM' that was truly faithful to the original concept of Yoshihisa Maitani's 35mm OM-1 and OM-2. The E-400/410 was a big step in the right direction as was the OM-D series – especially the petite E-M10 models – but none of these cameras seemed to quite recreate the overall appeal of those pioneering 35mm SLRs. The OM System OM-3 gets a whole lot closer because of its classical styling and, perhaps more importantly, its overall proportions that are very much like those of a 1970s 35mm SLR… *sans* handgrip of course. And it has to be said, there is arguably no prettier camera – of any design configuration or era – than a chrome 35mm OM-1. The OM-3 does a great job of looking the part, but with its own individual characteristics that quite seamlessly meld the traditional elements with the modern. Consequently, there's an integrity to the whole thing that really add to the overall appeal… because here is a camera that's as pretty as all-get-out on the outside, but a mirrorless powerhouse on the inside and with great ergonomics sowing it all together beautifully.

To see it is to want it and we suspect that Maitani-san would have heartily approved.

## VITAL STATISTICS

OM SYSTEM
OM-3

## OM SYSTEM OM-3 $3,199

body only, recommended retail price

Type: Enthusiast-level interchangeable lens digital mirrorless camera with Micro Four Thirds System bayonet lens mount.

Focusing: Automatic 'Cross Quad Pixel AF' hybrid system using contrast-detection and phase-difference detection measurements via the imaging sensor with 1053 X-type focusing points for each. Sampling at 120 fps with 100 percent scene coverage vertically and horizontally. Focus points may be selected manually or automatically by the camera. Area modes are Single, Small (3x3), Medium (9x7), Large (15x11), Cross (9 points horizontally, 7 vertically), or Custom shape/size (up to four). 'Intelligent Subject Detection AF' tracking modes for humans, animals, birds, motorsport (cars and motorcycles), aircraft (including helicopters) and trains. Eye/face/head/body detection for humans and animals. Up to eight targets can be tracked simultaneously. 'Starry Sky' AF mode. Manual switching between one-shot and continuous AF modes. Face/eye detection and auto tracking with adjustable sensitivity (five steps). Continuous manual override available with single-shot mode. In-camera AF limiter (three settings). Low light sensitivity down to -5.5 EV at ISO 100 and f/2.8. Low light/contrast assist via built-in illuminators. Focus assist via magnified image (3x/5x/7x/10x/14x) and focus peaking display (Red, Yellow, White or Black; High, Normal or Low intensity).

Metering: 324-point 'Digital ESP' (i.e. multi-zone), centre-weighted average, spot (2.0%) with highlight/shadow bias, and TTL flash. Spot metering can be linked to AF target. Metering range is EV -2.0 to 20 (f/2.8 and ISO 100).

Exposure Modes: Continuously-variable program with shift, shutter-priority auto, aperture-priority auto, metered manual, TTL auto flash and TTL flash.

Shutter: Electronic, vertical travel, metal blades, 60-1/8000 second plus B (up to 30 minutes). Flash sync up to 1/250 second. Sensor shutter has a speed range of 60-1/32,000 second with flash sync up to 1/50 second. Electronic first curtain shutter (EFCS) has a speed range of 60-1/320 second. Sensor/EFCS shutter delay timer (1/8, ¼, ½, 1, 2, 4, 8, 15 or 30 seconds). Exposure compensation up to +/-5.0 EV in 1/3, ½ or full stop increments.

Viewfinder: OLED EVF with 2.36 megadots resolution, 100 percent coverage and 0.83x magnification (35mm equivalent). 120 fps refresh rate. Adjustable for brightness and colour balance plus 'Simulated OVF' and 'Night View' modes. Anti-fogging coating on the eyepiece. 7.62 cm LCD TFT monitor panel with 1.62 megadots resolution, tilt/swing adjustments and touch screen controls. Adjustable for brightness and colour balance. Auto/manual switching between EVF and monitor screen.

Flash: No built-in flash. External flash units connect via hotshoe.

Additional Features: Magnesium alloy bodyshell sealed against dust and moisture (up to IP53 standard) and with insulation for operation down to -10 degrees Celsius. AE/AF lock, auto exposure bracketing (over three, five or seven frames), depth-of-field preview, programmable self-timer (1 to 30 second delays, 1 to 10 frames, and variable interval times), audible signals, auto power-off timer.

### DIGITAL SECTION

Sensor: 20.4 million pixels (effective) stacked BSI-type CMOS with 17.4x13.0 mm imaging area and 4:3 aspect ratio. 'Cross Quad Pixel AF' employs 80 million diodes (i.e. four at each pixel). No optical low-pass filter. Sensitivity equivalent to ISO 200-25,600 (extendable to ISO 80 and 102,400). 'TruePic X' processor. Total pixel count is 22.9 million.

Focal Length Magnification: 1.97x.

Formats/Resolution: Three JPEG compression settings, RAW output (12-bit lossless compression) and RAW+JPEG capture. Five resolution settings at 4:3 aspect ratio; 5184x3888, 3200x2400, 1920x1440, 1280x960 and 1024x768 pixels.

Five resolution settings at 3:2 aspect ratio; 5184x3456, 3216x2144, 1920x1280, 1296x864 and 1008x672 pixels. Five resolution settings (four available at any one time) at 16:9 aspect ratio; 5184x2920, 3200x1800, 2560x1440, 1920x1080, 1536x864, 1280x720 and 1024x576 pixels. Five resolution settings at 1:1 aspect ratio; 3888x3888, 2400x2400, 1440x1440, 960x960 and 768x768 pixels. Five resolution settings at 3:4 aspect ratio; 2912x3888, 1824x2432, 1104x1472, 720x960 and 576x768 pixels. 24-bit RGB colour for JPEGs, 36-bit RGB colour for RAW files. RAW files captured at 5184x3888 pixels.

Video Recording: MOV format (MPEG-4 AVC H.264 codec, 8-bit 4:2:0 colour, LongGOP compression) – 4K DCI at 4096x2160 pixels; 60, 50, 30, 25 or 24 fps and 17:9 aspect ratio (up to 202 Mbps). 4K UHD at 3840x2160 pixels; 60, 50, 30, 25 or 24 fps and 16:9 aspect ratio (up to 202 Mbps). Full HD at 1920x1080 pixels; 30, 25 or 24 fps and 16:9 aspect ratio (up to 202 Mbps with ALL-I compression, up to 27 Mbps with LongGOP). Full HD at 1920x1080 pixels; 60 or 50 fps and 16:9 aspect ratio (up to 52 Mbps).

MOV format (HEVC H.265 codec, 10-bit 4:2:0 colour, LongGOP compression) – 4K DCI at 4096x2160 pixels; 60, 50, 30, 25 or 24 fps and 17:9 aspect ratio (up to 152 Mbps). 4K UHD at 3840x2160 pixels; 60, 50, 30, 25 or 24 fps and 16:9 aspect ratio (up to 152 Mbps). Full HD at 1920x1080 pixels; 30, 25 or 24 fps and 16:9 aspect ratio (up to 82 Mbps with ALL-I compression, up to 22 Mbps with LongGOP). Full HD at 1920x1080 pixels; 60 or 50 fps and 16:9 aspect ratio (up to 162 Mbps with ALL-I compression, up to 42 Mbps with LongGOP). Full HD at 1920x1080 pixels; 240, 200, 120 or 100 fps and 16:9 aspect ratio (H.264) or 200, 120 or 100 fps (H.265). 'S&Q' speeds for FHD (from 1.0 fps to 200/240 fps with LongGOP, and up to 50/60 fps with ALL-I), 4K (from 1.0 fps to 50/60 fps) and C4K (from 1.0 fps to 50/60 fps). Stereo microphones with auto/manual adjustable levels, wind filter and attenuator. Stereo audio input (with plug-in power) and output. Standard 16-bit audio recording samples at 48 kHz, high resolution 24-bit audio recording mode samples at 96 kHz (requires a supporting external microphone).

Video Features: Hybrid IBIS and electronic image stabilisation; Flat, HLG (HDR) and OM-Log 400 10-bit colour profiles; time code support (rec run, free run, drop frame, non-drop frame), 'S&Q' fast/slow speeds for 2K/4K, centre marker, zebra patterns, grid lines (choice of four), focus peaking display (Red, Yellow, White or Black; High, Normal or Low intensity), web camera streaming (UVC/UAV)

HDMI Output: Uncompressed 8-bit 4:2:2 colour (4K/2K) with simultaneous recording internally (4:2:0 colour up sampled to 4:2:2). 12-bit 4:4:4 colour Apple ProRes RAW in 4K DCI or 4K UHD up to 60 fps.

Recording Media: Single slot for SD/SDHC/SDXC memory cards with UHS-II speed support.

Continuous Still Shooting: Unlimited JPEG/large/fine or RAW frames at 10.0 fps with the focal plane shutter (actual number of frames dependent on memory card capacity). Up to 375 JPEG/large/fine frames or up to 151 RAW frames at 20 fps with the sensor shutter and with continuous AF/AE adjustment. Up to 125 JPEG/large/fine frames or up to 102 RAW frames at 50 fps (SH2) with the sensor shutter and with continuous AF/AE adjustment (with selected M.Zuiko Digital PRO series lenses). Up to 90 JPEG/large/fine frames or up to 88 RAW frames at 120 fps (SH1) with the sensor shutter and with AF/AE locked to the first frame. Silent sequential shooting mode (5.0, 10, 15 or 20 fps), silent sequential shooting SH1 mode (30, 60, 100 or 120 fps) and SH2 mode (12.5, 16.7, 25 or 50 fps) with blackout-free EVF shooting. Three 'Pro Capture' modes pre-captures frames prior to full shutter release – 'Pro Capture' at 5/10/15/20 fps, 'Pro Capture SH1' 30/60/100/120 fps and 'Pro Capture SH2' at 12.5/16.7/25/50 fps. Number of pre-captured frames is programmable depending on the mode (up to a maximum of 70).

White Balance: TTL measurement via image sensor. Auto measurement, auto with 'keep warm colour', seven presets and four custom settings. White balance compensation (amber-to-blue and/or green-to-magenta) in all presets, white balance bracketing over three frames. Manual colour temperature setting from 2000 to 14,000 degrees Kelvin.

Interfaces: USB 3.0 (Type C), micro HDMI (Type D), 3.5 mm stereo audio input, 3.5 mm stereo audio output.

Additional Digital Features: Five-axis sensor-shift image stabilisation with up to 6.5 stops of correction (up to 7.5 stops with 'Sync IS' lenses), 'Live ND' built-in neutral density filter effects, (ND2, 4, 8, 16, 32, 64 and 128), 'Live Gradual ND' effects (ND2, 4 and 8; Soft, Medium and Hard edge; adjustable for position/angle via touch screen and with auto rotate), multi-frame 'High Res Shot' capture via pixel shift with in-camera processing (Handheld Mode = 25 or 50 MP resolution JPEG/fine or plus 12/14-bit RAW; Tripod Mode = 25, 50 or 80 MP resolution JPEG/fine or plus 12/14-bit RAW), sensor cleaning, Adobe RGB or sRGB colour space, flicker detection and correction, in-camera focus stacking (3 to 15 shots), long exposure noise reduction (Auto, On, Off), noise filter (Low, Standard, High, Off), Low ISO processing (Drive Priority or Detail Priority), noise reduction (Auto, On, Off), eight 'Picture Modes' (i-Enhance, Vivid, Natural, Muted, Portrait, Monotone, Underwater and Custom), adjustable 'Picture Mode' adjustments (Contrast, Sharpness, Saturation and Gradation – Auto, Normal, Low-Key, High-Key), monochrome modes have four contrast filters and four toning effects, four 'Colour Profile' presets (Standard/Natural, Chrome Film Rich Colour, Chrome Film Vivid and Chrome Film Soft Tone), 'Colour Profile Control' (12 colours adjustable for saturation, Sharpness, Contrast, Highlight/Shadow Control and Shading Effect – to customise the Colour 1/2/3/4 profiles), four 'Monochrome Profile' presets (Standard, Classic Film B&W, Classic Film IR and Classic Film Low Contrast), 'Mono Profile Control' (eight Colour Filter effects, Shading Effect, Film Grain Effect, Tone Effect, four Monochrome Colour effects, Highlight/Shadow Control, Sharpness, Contrast – to customise the Mono 1/2/3/4 profiles), 'Highlight/Shadow' function, 'Colour Creator' function (30 colours, seven saturation levels), double exposure facility (with auto exposure adjustment), 16 'Art Filter' adjustable effects applied at capture (Pop Art I/II, Soft Focus, Pale & Light Colour I/II, Light Tone, Grainy Film I/II, Pin Hole I/II/II, Diorama I/II, Cross Process I/II Gentle Sepia, Dramatic Tone I/II, Key Line I/II, Water Colour I/II, Partial Colour I/II/III, Vintage I/II/III, Bleach Bypass I/II, Instant Film), 'Live Composite' function (up to six hours exposure), 'Live Bulb/Live Time' modes, auto flicker detection/correction, 'Shading Compensation' vignetting correction, flicker scan for LED light sources, intervalometer (up to 9999 frames) and 2K/4K time-lapse movie clips, multi-shot HDR capture with in-camera compositing (Auto = HDR1 or HDR2. Manual = +/-2.0 EV over three, five or seven frames; +/-3.0EV over three or five frames), HDR bracketing (three, five or seven frames), auto bracketing modes (AE, WB, ISO, flash, focus and 'Art Filters'), post-camera focus stacking (up to 999 frames), Keystone Compensation, Fisheye Compensation, 'Super Control Panel' screen, real-time histogram display, guide grids (choice of five), dual-axis level indicator, highlight and shadow alerts (adjustable thresholds via histogram), adjustable image display time, auto image rotation, slide show (with a choice of music and transitions), playback zoom (up to 14x), 4/9/25/100/Calendar thumbnail displays (also available in slide show mode), star rating, 'Lightbox' side-by-side comparison display, in-camera editing functions (Shadow Adjust, Red-Eye Fix, Crop, Aspect, B&W, Sepia, Saturation and Resize), in-camera RAW-to-JPEG conversion, in-camera RAW image overlay, copyright info, silent shooting, DPOF and PictBridge support, WiFi 2.4 GHz and Bluetooth LE 4.2 connectivity.

Power: One 7.2 volt/2280 mAh rechargeable lithium-ion battery pack (BLX-1 type). In-camera recharging and powering via USB-C.

Dimensions (WxHxD): body only = 139.3x88.9x45.8 mm.

Weight: body only = 413 grams (without battery pack or memory cards).

Price: $3199 body only. $3799 with M.Zuiko Digital 12-45mm f/4.0 PRO zoom lens.

Distributor: OM Digital Solutions Australia, telephone 1300 659 678, or visit https://explore.omsystem.com/au/en/

Photo credit | **'Resting assassin' (Robberfly) by Jamee van den Brink** | Jamee works at Toowoomba Camera House and he created this amazing photo with a Canon 90D camera + Canon EF 100mm macro lens | **Image details** f/2.8 | Shutter 1/160 | Aperture f/8 | ISO 4000.

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# VIEW FINDERS

The 11th International Landscape Photographer Of The Year
The many wonders of natural landscapes are dramatically captured in all their drama, glory and mystery in the winning pictures – along with the 'Top 101' finalists – in the 11th running of the world's premier international competition for landscape photography.

Andrew Mielzynski from Canada emerged from a pack of over 3600 entries from around the world, to be judged the winner of the 11th International Landscape Photographer Of The Year competition (this prize is based on a folio submission of at least four images). Second place was awarded to Ignacio Palacios from Australia while in third was Gheorghe Popa who is from Romania.

The winner of the 11th International Landscape Photograph Of The Year – which is awarded for a single image – is Ryohei Irie from Japan. The second prize in this category was won by Justinus Sukotjo from Indonesia, and the third place-getter is Himadri Bhuyan from India.

"I look for minimalism – simple uncluttered compositions and small intimate scenes," explains Andrew Mielzynski. "I'm a very passionate and dedicated amateur photographer, with a deep connection to the natural environment and a love for capturing its magnificence, splendour and glory. I have always enjoyed spending time in nature and photography has been a gift that has enabled me to see and appreciate things that would not have been noticed otherwise.

"I love to slow down, observe and discover small, intimate scenes.

"Photography has given me a tremendous amount of joy throughout my life, especially the ability to capture moments in time inspired by the natural world.

"When I was young, our family used to stay in a cottage in Ontario, Canada. I remember long hikes through the landscape, talking about the plants and animals and enjoying the amazing sunsets over Georgian Bay.

One time, my parents invited a good friend up for the weekend. He brought his Minolta SLR film camera and encouraged me to take a few photographs with it. Two weeks later, he showed up with three prints, one of a pair of flying ducks, one of a frog and the third of one of our fabulous sunsets. I still have those prints all these years later. The images were all soft and blurry, but when I saw them, I was filled with an immense feeling of pride and

The competition also includes five special subject categories and these winners were…

- **The Black & White Award**
  J. Fritz Rumpf (USA)
- **The Aerial Award**
  Benjamin Barakat (Switzerland)
- **The Snow & Ice Award**
  Jeroen Van Nieuwenhove (Iceland)
- **The Exciting Sky Award**
  Federico Delucchi (Italy)
- **The Forest Award**
  Shirley Wung (Taiwan)

◀ *A Fabulous Sunrise, Atacama Desert* by Andrew Mielzynski (Canada)

◀ *Winter Cottonwoods* by Andrew Mielzynski (Canada)

◀ *Winter Elm In Snow Storm* by Andrew Mielzynski (Canada)

accomplishment. I was hooked!

Today, Andrew uses a Canon EOS R5 mirrorless cameras with EF 16-35mm f/4.0, RF 24-105mm, EF 70-200mm f/2.8 and EF 100-400mm f/4.5-5.6L IS USM lenses.

After coming second in last year's portfolio competition, Andrew was motivated to try again and see if he could go one better and bag the top prize.

"I enjoy the process of entering the competition and wanted to enter again this year because it forces me to get organised, work on my photographs, get them ready and submit. I also love the book and find it extremely satisfying to be included with so many fabulous landscape photographers from around the world."

## International Landscape Photograph Of The Year

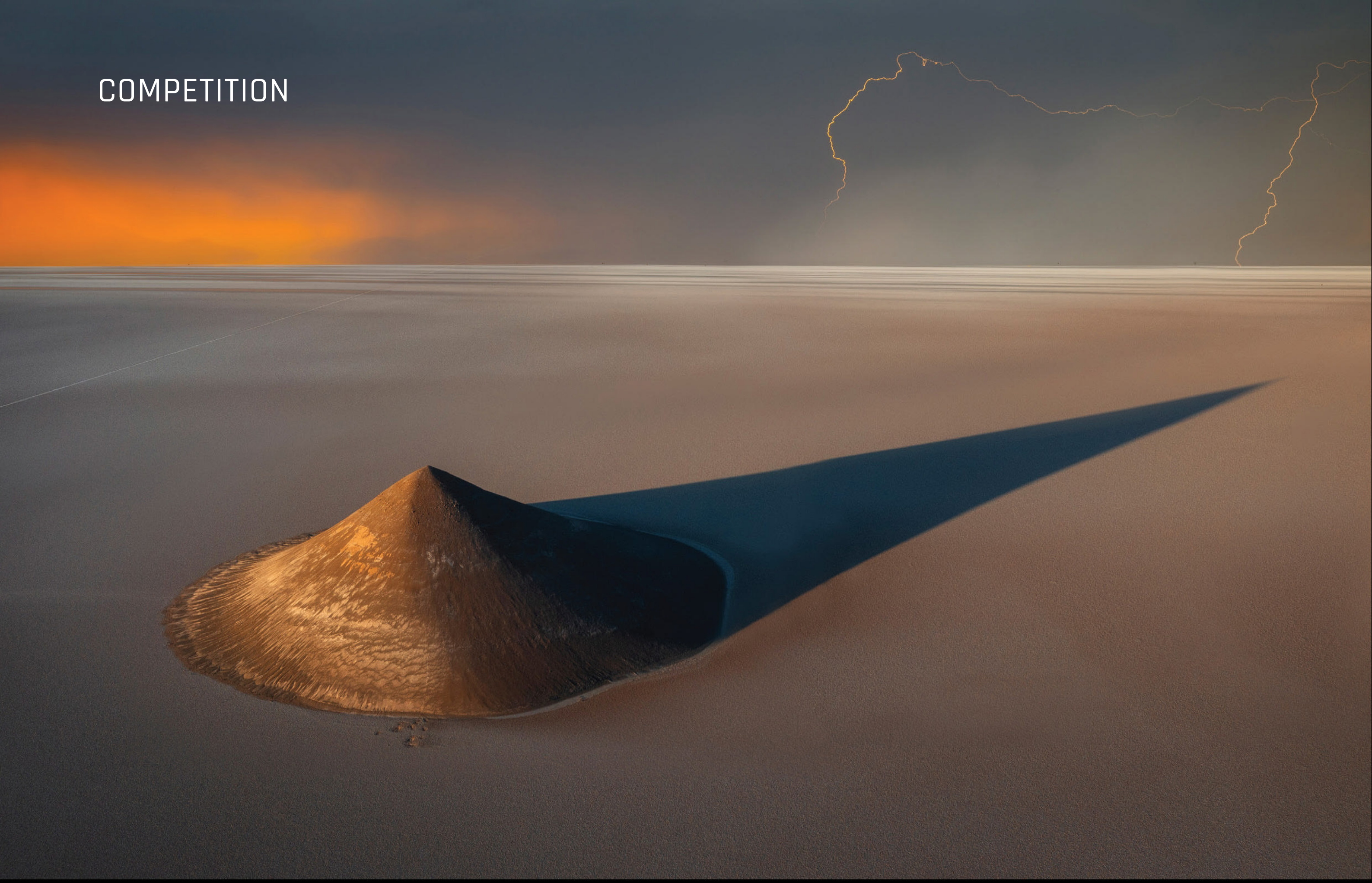
Telling the story of his winning single image – which is titled Traces Of Light and depicts fireflies darting round a stand of dead trees –Ryohei Irie says "I have been visiting this location for several years during the firefly season and it is an interesting place because the intensity and length of the firefly light and the location where the fireflies fly vary greatly, depending on the year and time of day, resulting in completely different works, even when photographed in the same way."

Ryohei works as a researcher in a company, and produces and sells nature landscape photography. "I started creating works of art with photography around 2018. I originally loved traveling to places rich in nature, but I started creating photographic works because I wanted to preserve not only the simple beauty of natural scenery, but also the changing seasons and the workings of nature.

"I believe landscape photography is the best way to express the natural order of things and the beauty that results from it."

You can see all the 'Top 101' finalists in the 2024 competition – and an additional 101 highest-scoring images – at **www.internationallandscapephotographer.com** You can also order the 2024 awards book from this site.

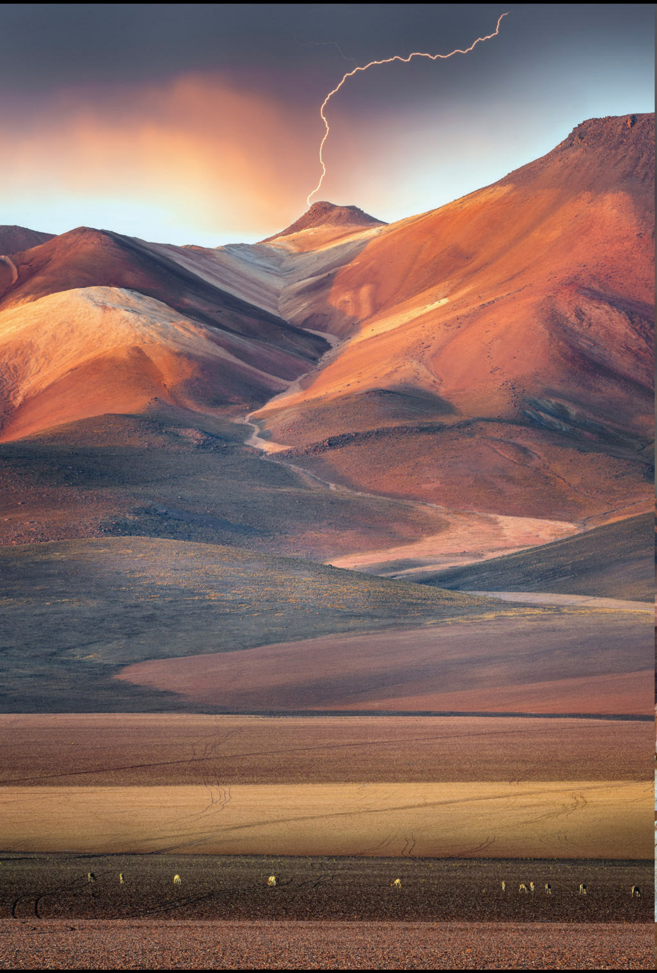
▼ *Thin Ditch Ice Along Country Road* by Andrew Mielzynski (Canada)

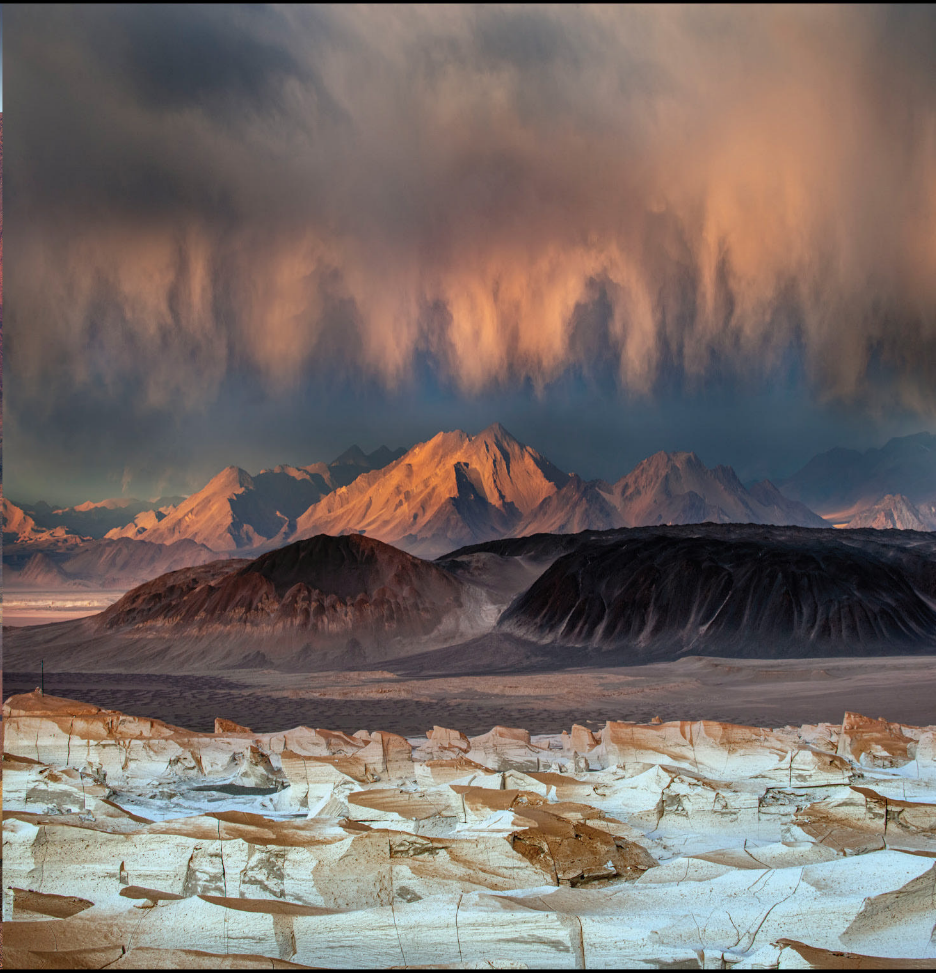


▼ *7 Colours Mountain* by Ignacio Palacios (Australia), second place in the 11th International Landscape Photographer Of The Year 2024.

▲ *Arita Cone* by Ignacio Palacios (Australia), second place in the 11th International Landscape Photographer Of The Year 2024.

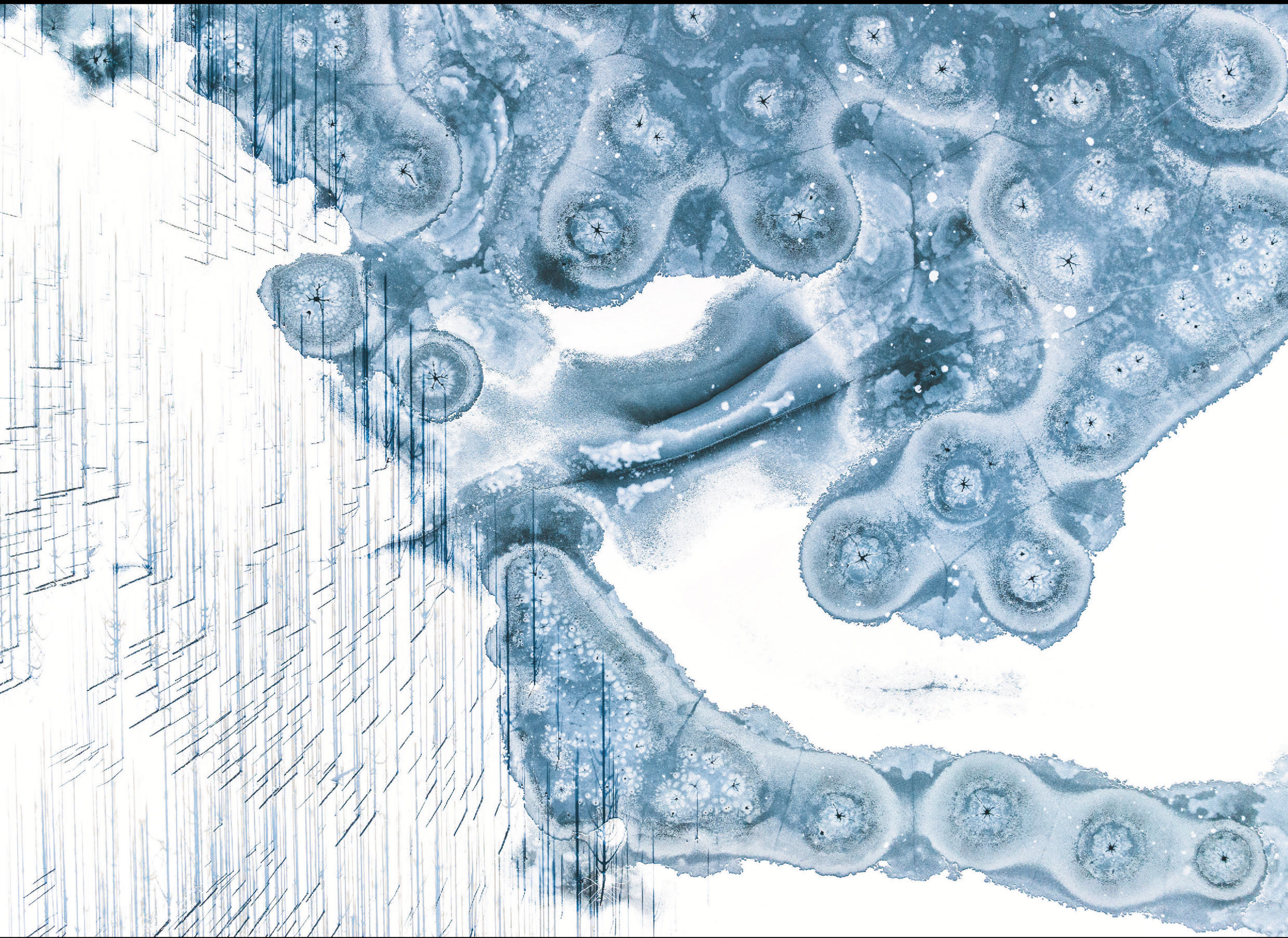
▼ *Pumice Field* by Ignacio Palacios (Australia), second place in the 11th International Landscape Photographer Of The Year 2024.





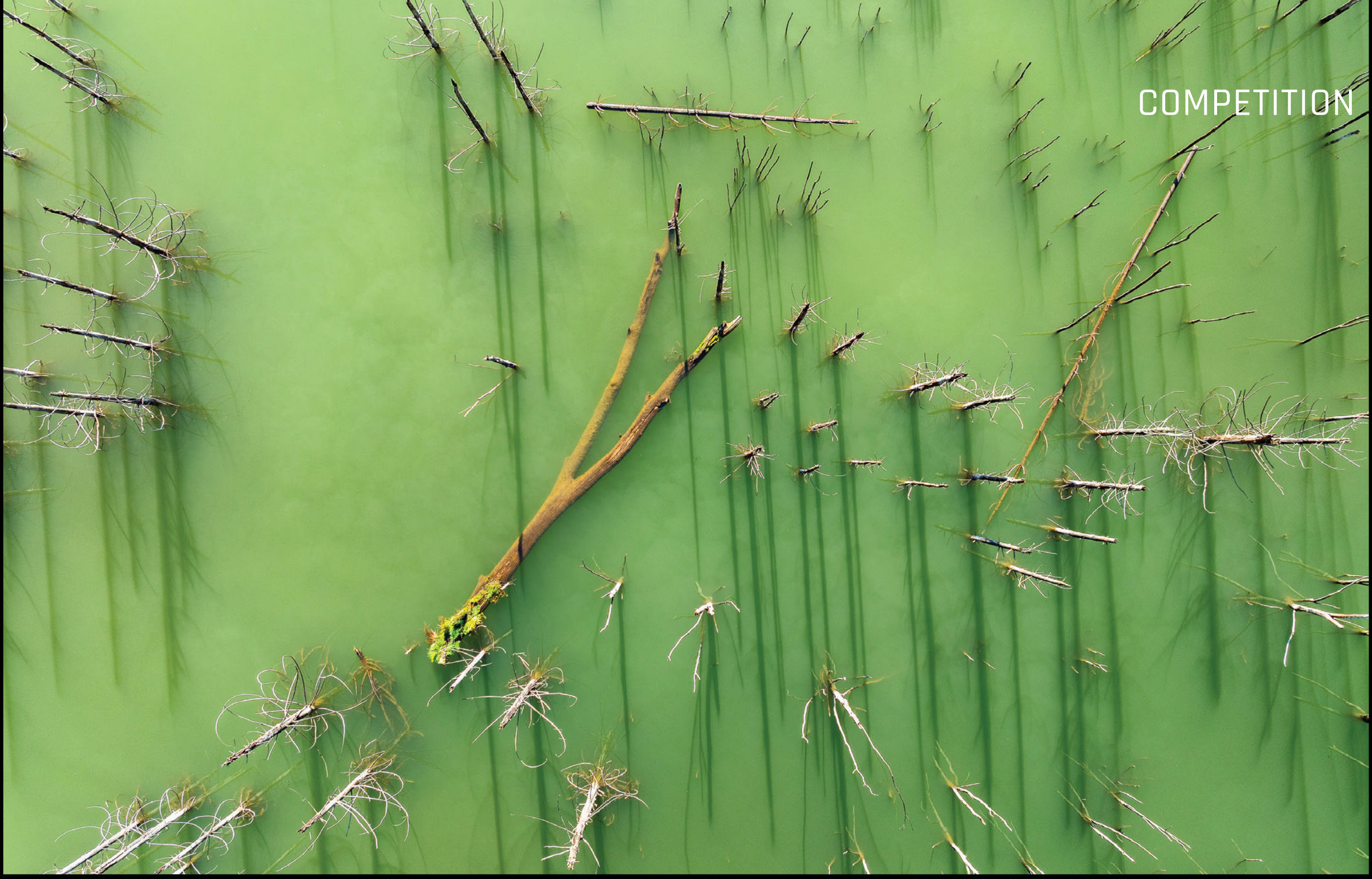
▲ *Yangykala Canyon* by Ignacio Palacios (Australia), second place in the 11th International Landscape Photographer Of The Year 2024.

▼ *Glacial Enigma* by Gheorghe Popa (Romania), third place in the 11th International Landscape Photographer Of The Year 2024.



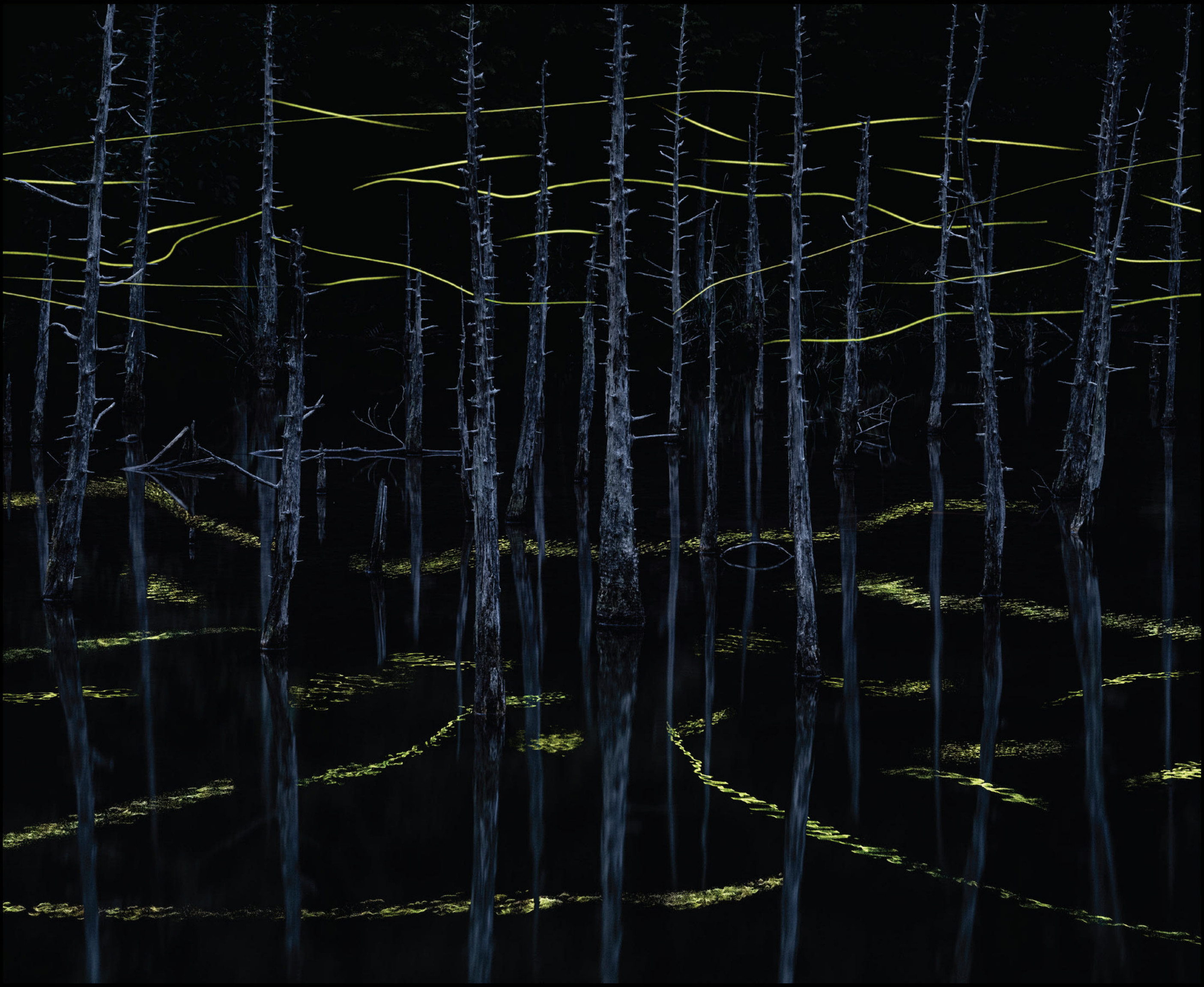
▲ *Early Autumn* by Gheorghe Popa (Romania), third place in the 11th International Landscape Photographer Of The Year 2024.

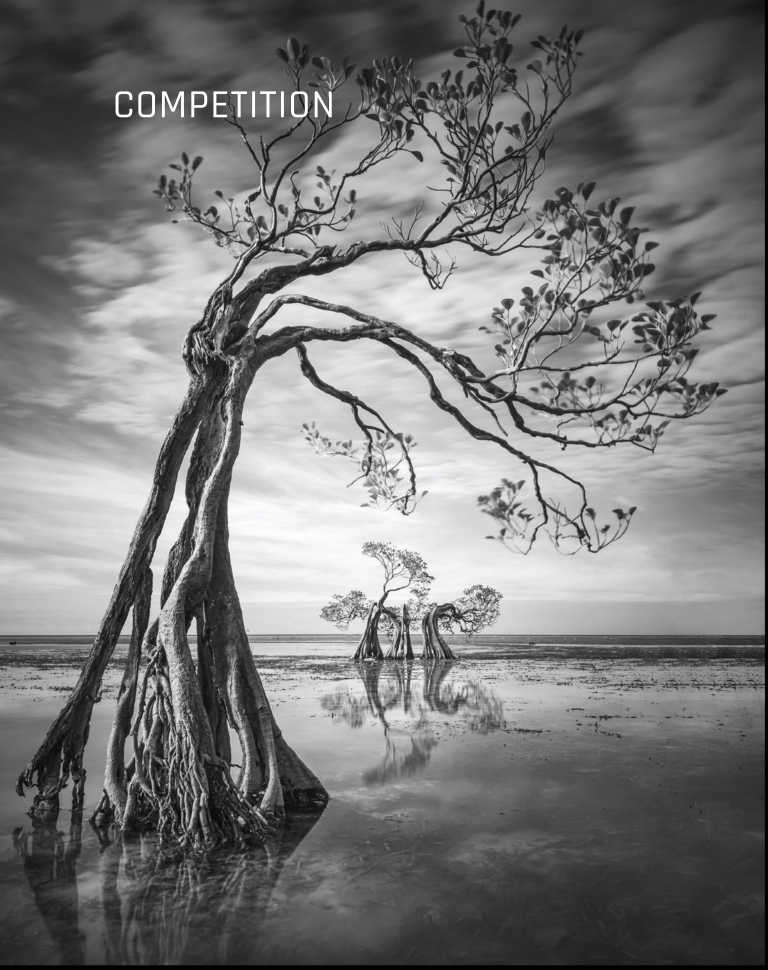
▼ *Poisoned Beauty* by Gheorghe Popa (Romania), third place in the 11th International Landscape Photographer Of The Year 20234



▲ *Whisper Of The Sunken Trees* by Gheorghe Popa (Romania), third place in the 11th International Landscape Photographer Of The Year 2024.

▼ *Traces Of Light* by Ryohei Irie (Japan), winner of the 11th International Landscape Photograph Of The Year, 2024.





▲ *Mother Care Framing* by Justinus Sukotjo (Indonesia), second in the 11th International Landscape Photograph Of The Year, 2024.

▼ *The Flow* by Himadri Bhuyan (India), third in the 11th International Landscape Photograph Of The Year, 2024.

▲ *The Final Dune* by Benjamin Barakat (Switzerland), winner of The Aerial Award, the 11th International Landscape Photographer Of The Year, 2024.

▲ *White Tie Affair* by J.Fritz Rumpf (USA), winner of The Black & White Award, the 11th International Landscape Photographer Of The Year, 2024.

▼ *Fireflies Flying In* by Shirley Wung (Taiwan), winner of The Forest Award, the 11th International Landscape Photographer Of The Year, 2024.

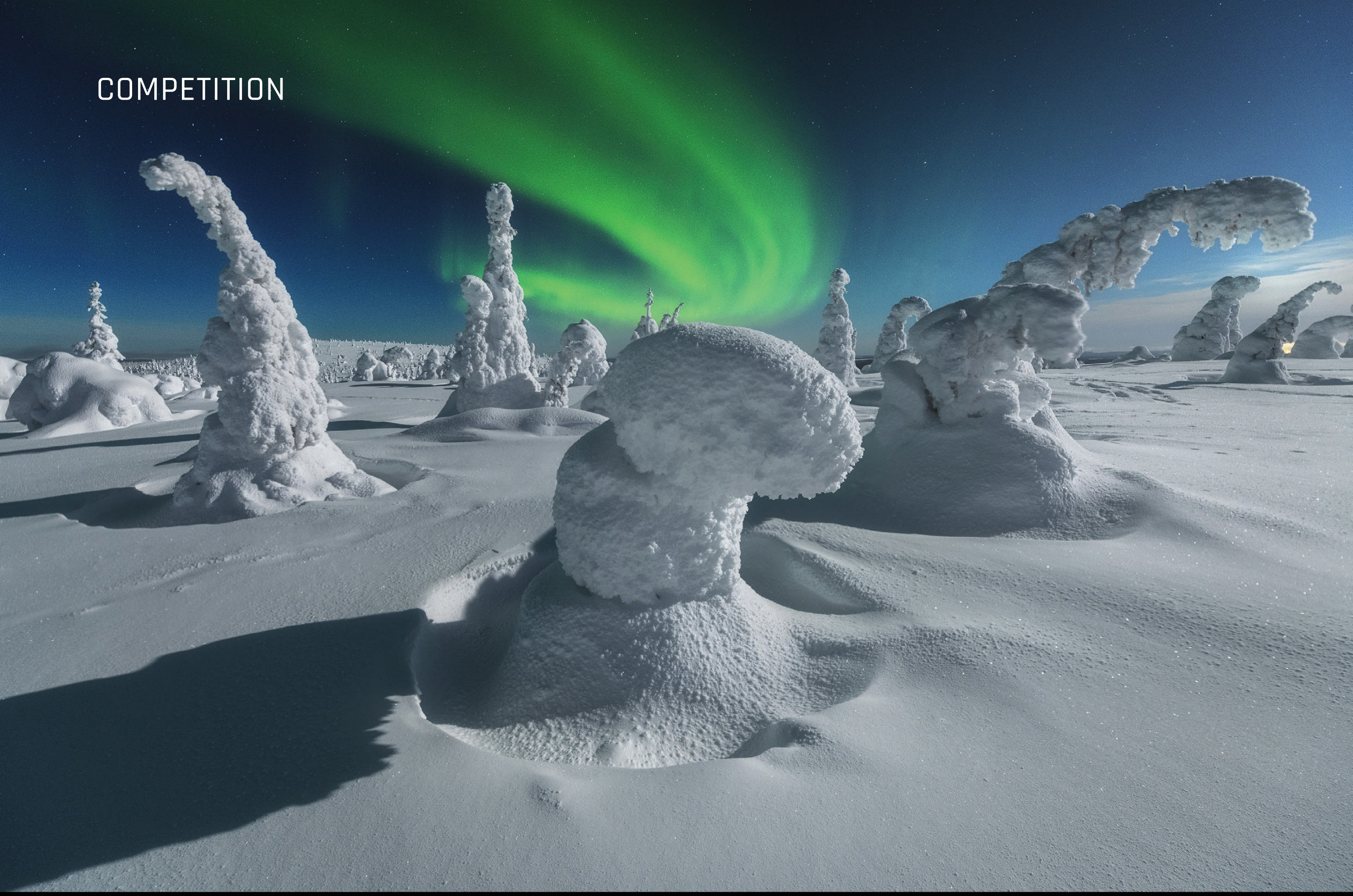
▼ *Isþyrlu – Ice Swirl* by Jeroen Van Nieuwenhove (Iceland), winner of The Snow & Ice Award, the 11th International Landscape Photographer Of The Year, 2024.

▲ *Meteor Shower* by Federico Delucchi (Italy), winner of The Exciting Sky Award, the 11th International Landscape Photographer Of The Year, 2024.

▼ *Blue Forest* by Isabella Tabacchi (Italy), Top 101 finalist, the 11th International Landscape Photographer Of The Year, 2024.

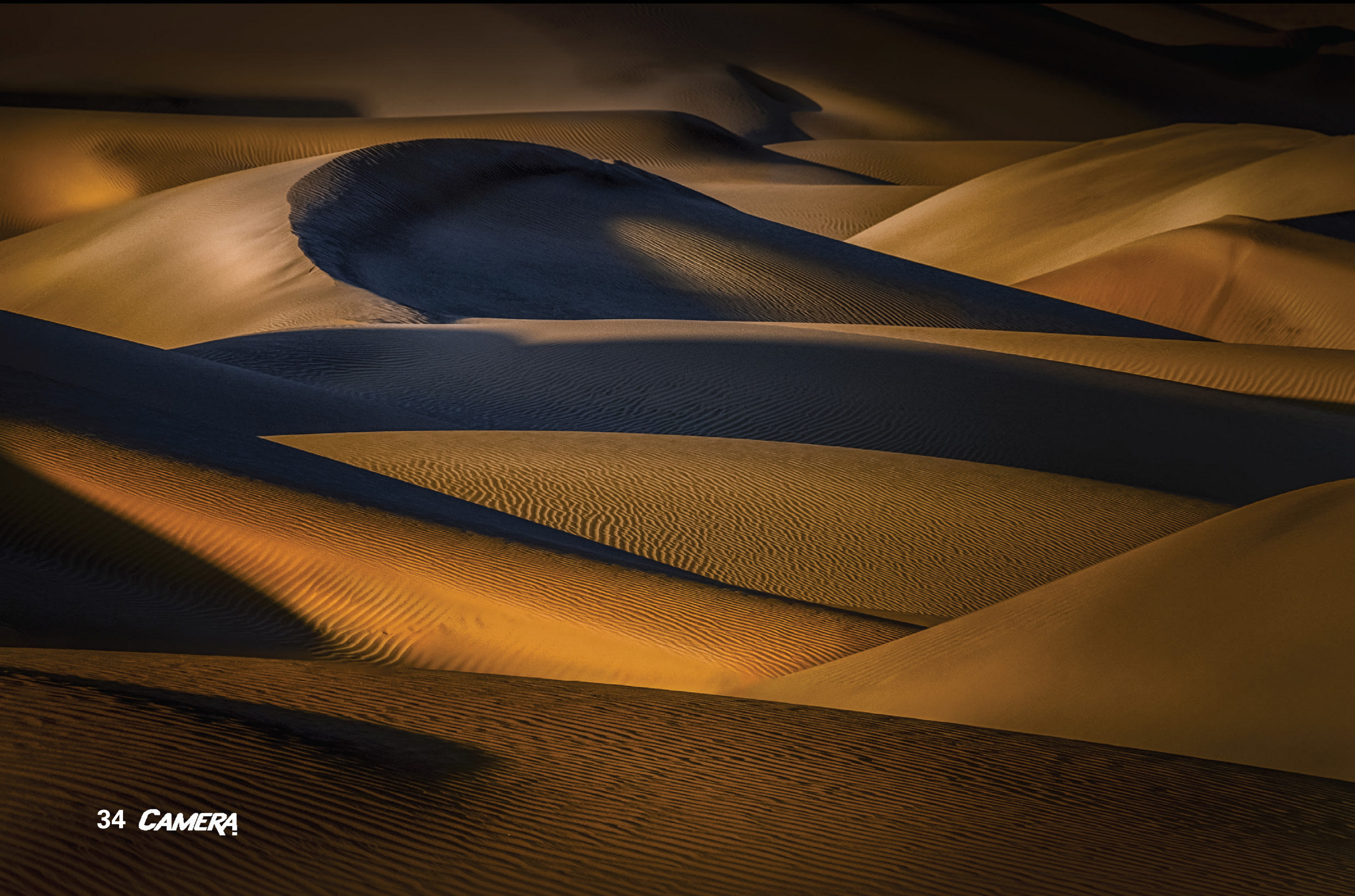
▲ *Luna Dunes* by Jeff Lovelace (USA), Top 101 finalist, the 11th International Landscape Photographer Of The Year, 2024.

▼ *The Mystic Tree* by José Miguel Picón Chimelis (Spain), Top 101 finalist, the 11th International Landscape Photographer Of The Year, 2024.



▲ *Fox Touch* by Leonardo Papèra (Italy), Top 101 finalist, the 11th International Landscape Photographer Of The Year, 2024.

▼ *Death Valley Curves* by Craig Mcgowan (Australia), Top 101 finalist, the 11th International Landscape Photographer Of The Year, 2024.



▲ *Striking* by David Swindler (USA), Top 101 finalist, the 11th International Landscape Photographer Of The Year, 2024.

▼ *Yggdrasill* by Matteo_Strassera (Italy), Top 101 finalist, the 11th International Landscape Photographer Of The Year, 2024.

REPORT BY **PAUL BURROWS**

# FUJIFILM
# X-M5

FUJIFILM
X-M5
FUJINON ASPHERICAL LENS
SUPER EBC XC 15-45mm 1:3.5-5.6 OIS PZ Ø52

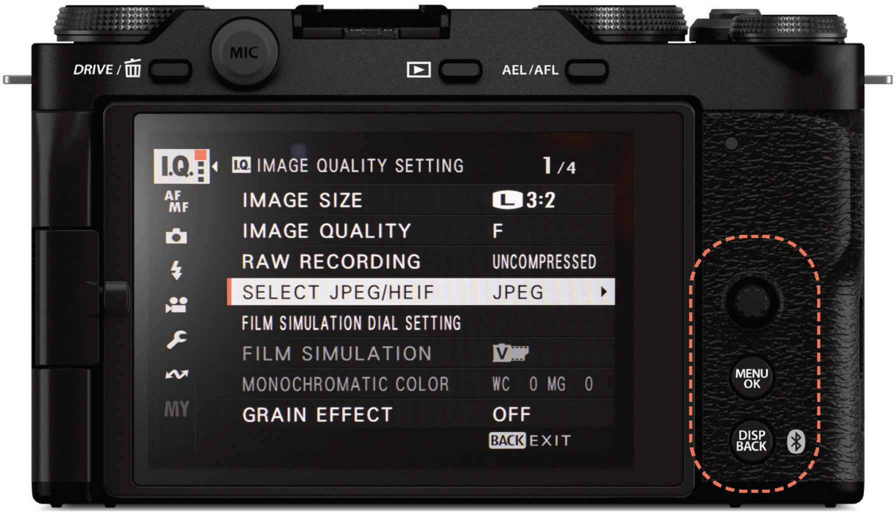
▲ Looks great, doesn't it? Very compact and neat RF-styled X mount camera… what's not to like? Hmm… let's start with the omission of an EVF. Probably not such a big deal for video shooters, but potentially quite problematic for photographers. On the plus side, the X-M5 still has plenty of other things to like.

# HIDDEN TALENTS

## Fujifilm has revived its compact X-M X mount line primarily to tap into the growing video content creator market, but as it turns out, the X-M5 is much more than a one-trick pony.

OK, let's get the bad news out of the way right at the beginning. The X-M5 doesn't have an eyelevel viewfinder because it's primarily aimed at people who, apparently, don't ever use one. Normally, this omission would mean it warrants only a cursory look in this magazine and not a full test, but… It's a biggish "but" too. Y'see, the X-M5 is super compact – partially, of course, because there's no EVF – but because it uses current-gen 'X Processor 5' engine, it has a feature set that's on a par with a number of significantly pricier current X mount bodies. The processor is mated with Fujifilm's fourth-generation, 26.1 megapixels 'X-Trans CMOS 4' which we know delivered a very creditable performance in the X-T4 and the X-T30 II (as well as the X100V). You get the latest iteration of Fujifilm's subject-detection hybrid AF, the full set of current 'Film Simulation' profiles, continuous shooting at 20 fps (30 fps with a crop) and up to 6.2K res video with 10-bit colour. And all this in a camera body that's pretty much pocket-sized when there isn't a lens fitted… but which will accept everything that's in the X mount system along with all the third-party offerings. Worth a closer look then? We reckon so.

That said, it is still a pity Fujifilm didn't think about providing the option of fitting an accessory EVF for those that might want one, but then it probably doesn't want enthusiast-level shooters taking the



I.Q. IMAGE QUALITY SETTING 1/4
IMAGE SIZE L 3:2
IMAGE QUALITY F
RAW RECORDING UNCOMPRESSED
SELECT JPEG/HEIF JPEG
FILM SIMULATION DIAL SETTING
FILM SIMULATION V
MONOCHROMATIC COLOR WC 0 MG 0
GRAIN EFFECT OFF
BACK EXIT

▲ Rear panel layout also keeps it simple. Joystick controller performs a number of navigational duties.

cheaper route into X mount photography… can we interest you in the X-T50 which will relieve you of around another $1100 more? But can the X-M5 really be considered an enthusiast's camera? Well, if you can live with the compromises – and it's quite possible that you could, given there are some compelling plusses – it's not out of the question. And, if you're a bit clever – and shoot mainly with prime lenses – you could probably find optical finder solutions that could work quite well. The biggest plus is the size – and the fact that the X-M5 subsequently looks very neat indeed – which is arguably enough to make it well worth considering for applications other than what it's primarily designed for… travel and street photography spring immediately to mind.

So, what is it designed for exactly? Well, according to Fujifilm Australia, it's something that around a quarter of the population is doing and, of course, they'd like them to use a proper camera rather than a smartphone. Essentially, this is desktop-based video presentations created flying solo – so you're obviously not going to use an EVF – which could be spruiking a product, cooking a dish or one of those really handy YouTube videos that shows you exactly how to do something… seemingly no matter how obscure. Consequently, vlogging cameras need to be small, lightweight and really easy to use, but with plenty of features because a lot of these online videos are actually pretty nicely produced (and, these days, they need to be if you're going to keep watching). Nikon, Panasonic and Sony all have competitive models; but all are arguably missing a trick by not having a built-in EVF or, indeed, offering the option of fitting one.

Incidentally, the X-M5 has a predecessor in the X-M1 which was launched all the way the back in 2013 and was more targeted at photographers (no EVF, but a built-in flash which the X-M5 doesn't have), albeit not necessarily enthusiast-level shooters. Also, too, you may remember Fujifilm's popular line of high-end fixed-lens compacts with the last-of-the-line X30 (2014) having an OLED EVF and a 2/3-inch version of the 'X-Trans II' CMOS sensor. The point here is that you could once have all Fujifilm's digital imaging goodness in a much smaller package… and, if nothing else, the X-M5 is now capable of filling that gap.

> YOU COULD ONCE HAVE ALL FUJIFILM'S DIGITAL IMAGING GOODNESS IN A MUCH SMALLER PACKAGE… AND, IF NOTHING ELSE, THE X-M5 IS NOW CAPABLE OF FILLING THAT GAP."

## UP TO SPEED

The fourth-generation 'X Trans' BSI-type CMOS sensor has an effective pixel count of 26.1 million. As just noted, in the X-M5 it's mated with the current quad-core 'X Processor 5' engine which enables continuous shooting at 20 fps for full-res stills and 4K video recording in both the DCI (4096x2160 pixels) and UHD (3840x2160 pixels) resolutions at 25/30 fps, using the full sensor width (i.e. oversampled at 6.2K which enhances the image quality). See the Making Movies panel for the rest of this camera's video story.

Like all the fifth-gen X mount bodies, the X-M5 has 10-bit HEIF capture among its format options which delivers rich HDR files, but more efficient compression means that these are no bigger in size than 8-bit JPEGs. Both HEIFs and JPEGs are captured at either Fine or Normal compression levels and at three image sizes plus, of course, there's the option of RAW+JPEG or RAW+HEIF recording. The maximum image size for stills is 6240x4160 pixels and there's a choice of three aspect ratios – namely 3:2, 16:9 and 1:1. In-camera conversion is available to turn the HEIF files into JPEGs or into either 8-bit or 16-bit TIFFs. Additionally, RAW files can be converted into either JPEGs or HEIFs.

FILM
FS1
FS2
FS3
C
STD
V
S

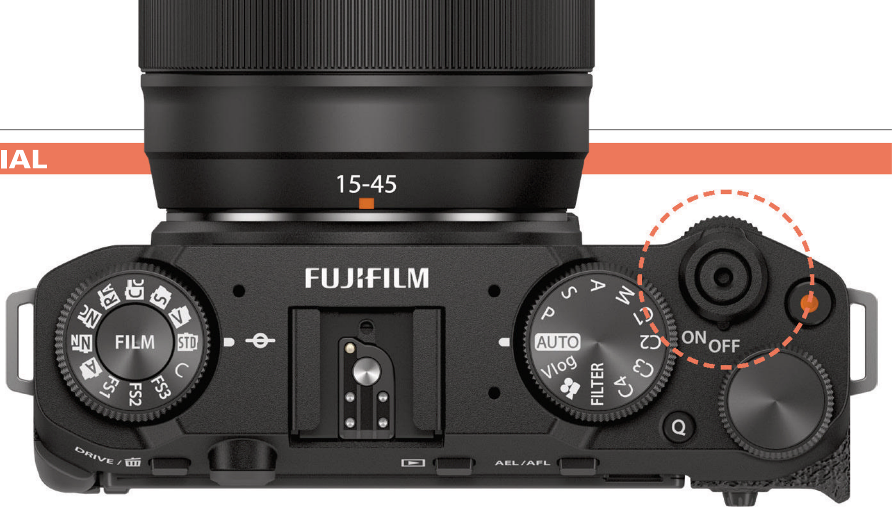
▲ 'Film Simulation' dial allows for quick to the main profiles and you can add three more of your favourites to the 'FS' positions.

P
S
A
M
C1
C2
C3
C4
FILTER
Vlog
AUTO
ON

▲ Main mode dial includes a dedicated Vlog position as on the X-S20.

64GB
600x Speed

▲ Memory card slot shares the battery compartment which means that you can't get to it if the X-M5 is mounted on a tripod.



▲ Shutter release button retains cable release socket.

Still capture at 30 fps is possible if you're happy with a 1.25x crop (which still gives a resolution of 16.6 megapixels), and obviously when using the camera's sensor shutter. A physical focal plane shutter is retained and here the fastest shooting speed is 8.0 fps. The buffer memory enables up to 173 best-quality JPEGs when shooting at 8.0 fps and 82 compressed RAW files. Alternatively, RAWs can be alternatively captured with lossless compression or uncompressed; all options with 14-bit RGB colour. When shooting with the sensor shutter at 20 fps the burst lengths are 127 for best-quality JPEGs and 60 compressed RAW files which extend to 141 and 81 respectively if you opt for the 1.25x crop at this frame rate. At 30 fps – when, of course, you have no choice – the numbers are 128 and 78 respectively. There's a 'Pre-Shot' function which commences continuous capture immediately that the shutter release button is at the half-way position (i.e. for metering and autofocusing), and this can be set to 30, 20 or 10 fps with a rolling one second of frames.

As with the X-T50, the X-M5 doesn't have in-body image stabilisation which may have something to do with keeping the body as small as possible, but also because for vlogging, for example, it'll most likely be used on a tabletop tripod of some variety.

Not surprisingly, the X-M5 only has a single memory card slot, and only with UHS-I speed support, but nothing that the camera does – including its video bit rates – demands UHS-II so it isn't really an issue.

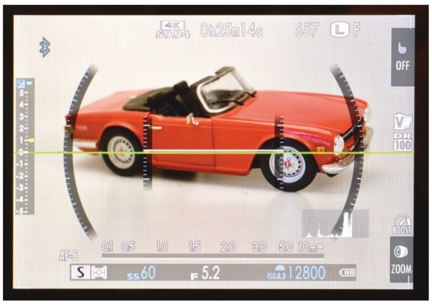
## CLASSIC LOOKS

Also as noted in the introduction, the X-M5 has the current full set of Fujifilm's 'Film Simulation' profiles which include the most recent Nostalgic Neg and Reala Ace settings. These profiles are applied directly to JPEGs (or HEIFs) and appended to a RAW file as a post-camera processing option (when there's actually the option to switch between any of them). Nostalgic Neg replicates the look of 1970s colour prints complete with a bit of age-related fading, while Reala Ace is the digital replication of a fine-grained Fujicolor ISO 100 colour negative film. Later known as Superia Reala, Reala Ace incorporated Fujifilm's fourth layer technology – which was a big deal at the time – to enhance the colour accuracy, particularly of skin tones, but also the reds and other warmer colours to give a more natural-looking rendition.

After selecting a 'Film Simulation' setting, further tweaking is possible with adjustable parameters for Colour (i.e. saturation), Sharpness, Highlight/Shadow Tone Curve and Clarity. The two B&W profiles – Monochrome and ACROS (named after Fujifilm's popular ISO 100 B&W film) – have a 'Monochromatic Colour' adjustment which tints in the warm-to-cool and magenta-to-green ranges (plus there are the usual contrast control filters in yellow, red and green). Additionally, there's a set of effects – 'Grain Effect', 'Colour Chrome Effect' and 'Colour Chrome Effect Blue' – which are also adjustable.

There's an auto bracketing mode for 'Film Simulation' profiles (so three can be applied simultaneously), as well as for exposure, dynamic range, ISO, white balance and focus. The focus bracketing can be set for up to 999 frames with a shift in the focus from one through to ten steps.

The other in-camera technical adjustments include 'Dynamic Range Priority' processing, dynamic range



▲ The live view display can be extensively customised and selectable elements include a real-time histogram, 2D/3D level indicators, guide grids and a focus distance indicator.

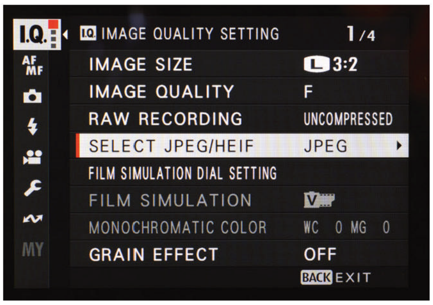
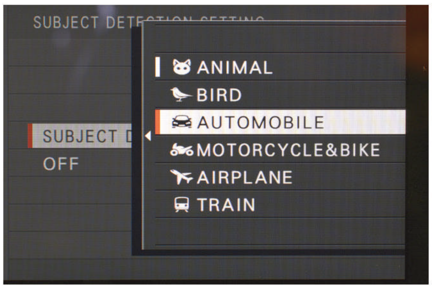


IMAGE QUALITY SETTING 1/4

IMAGE SIZE L 3:2
IMAGE QUALITY F
RAW RECORDING UNCOMPRESSED
SELECT JPEG/HEIF JPEG
FILM SIMULATION DIAL SETTING
FILM SIMULATION V
MONOCHROMATIC COLOR WC 0 MG 0
GRAIN EFFECT OFF
BACK EXIT

▲ As per all the fifth-generation X mount models, the X-M5 has the option of 10-bit HEIF (HDR) capture.

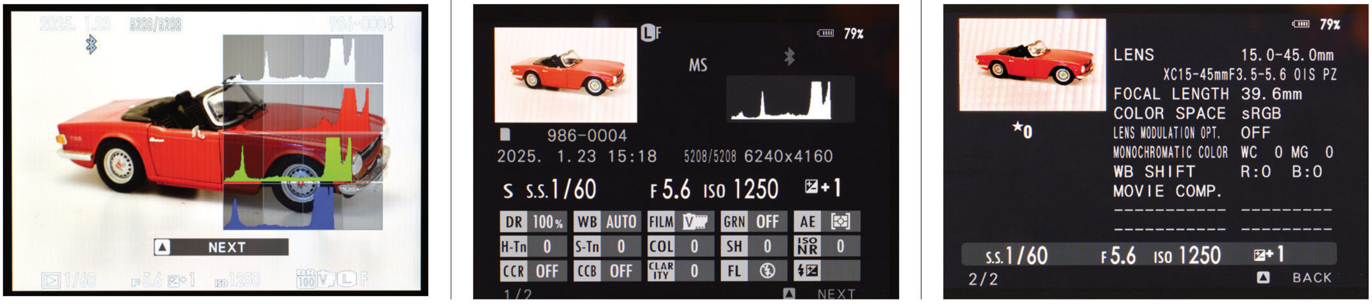


SUBJECT DETE

SUBJECT D
OFF

ANIMAL
BIRD
AUTOMOBILE
MOTORCYCLE&BIKE
AIRPLANE
TRAIN

▲ AF system has AI-based subject recognition for people, animals, birds (which includes insects), cars, motorcycles and push bikes, trains and aircraft (including drones).



NEXT

L F 79%
MS
986-0004
2025. 1.23 15:18 5208/5208 6240x4160
S S.S.1/60 F 5.6 ISO 1250 +1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DR | 100% | WB | AUTO | FILM | V | GRN | OFF | AE | |
| H-Tn | 0 | S-Tn | 0 | COL | 0 | SH | 0 | ISO NR | 0 |
| CCR | OFF | CCB | OFF | CLARITY | 0 | FL | | | |

1/2 NEXT

79%
LENS 15.0-45.0mm
XC15-45mmF3.5-5.6 OIS PZ
FOCAL LENGTH 39.6mm
COLOR SPACE sRGB
LENS MODULATION OPT. OFF
MONOCHROMATIC COLOR WC 0 MG 0
WB SHIFT R:0 B:0
MOVIE COMP.
★0
S.S.1/60 F 5.6 ISO 1250 +1
2/2 BACK

▲ Replay screens include a set of superimposed histograms and thumbnails with two sets of capture data.

expansion processing, multi-shot HDR capture and Fujifilm's 'Lens Modulation Optimiser' which corrects for diffraction blur when using very small aperture settings. All other lens corrections are performed automatically behind-the-scenes.

Additionally the X-M5 has a multiple exposure facility, an intervalometer, in-camera panoramas, and flicker detection with auto shutter speed correction. The multiple exposure facility allows for a total of nine frames to be combined with the choice of Additive, Average, Comparative Light or Comparative Dark exposure management options. The intervalometer has a facility for recording unlimited frames or, alternatively, it can be set to a specific count of up to 999 frames.

## LEARNING THE SUBJECT

The X-M5 also gets all the autofocusing updates that have come with the other fifth-gen bodies, so subject recognition is available for people, animals, birds (which includes insects), cars, motorcycles and push bikes, trains and aircraft (which includes drones). Face/eye detection is the default acquisition and tracking mode for people, and it can deal with people wearing goggles, spectacles or masks, or if the subject is in profile. It can also be set to prioritise either the right or left eye. However, it also remains that human face/eye detection is automatically switched off if you select one of the other subject recognition modes (and vice versa) so switching between involves more steps than is the case when everything is in the same place. In the camera's fully automatic mode, automatic subject recognition comes into play, but it's not available as an option otherwise.

> THE BIGGEST PLUS IS THE SIZE WHICH IS ARGUABLY ENOUGH TO MAKE THE X-M5 WELL WORTH CONSIDERING FOR APPLICATIONS OTHER THAN WHAT IT'S PRIMARILY DESIGNED FOR”

The phase-detection autofocusing has 425 selectable measuring points which are arranged in a 25x17 pattern with the option of switching to 117 points in a 13x9 pattern for quicker selection. Low light sensitivity extends down to -7.0 EV at ISO 100 and f/1.0, but a more realistic number – given that X-T50 buyers probably won't own the XF 50mm f/1.0 prime lens – is -4.0 EV at f/2.8.

There's a whole bunch of AF area which

## MAKING MOVIES

**If you're a video shooter doing more** than just desktop work, the X-M5 still makes a lot of sense, and the lack of an EVF is much less of an issue. Plus you can certainly take advantage of its compact size and compatibility with a big system of interchangeable lens. It works well with a gimbal or in a rig with an external recorder. For its primary intended usage, the main mode dial has a 'Vlog' setting (as does the X-S20) which brings up a dedicated touch screen display and access to specific modes – namely Portrait Enhancer, Product Priority and Background Defocus – which are designed to make it easier to shoot more professional-looking videos without needing a lot of experience. There's also a 'Short Movie' mode for shooting short Full HD clips (15, 30 or 60 seconds) in the vertical 9:16 aspect for replay on smartphones. However, this format is also available with normal recording and with access to higher bit rates. Interestingly too, the X-M5 can be fitted with the optional FAN-001 cooling fan to extend the possible shooting durations at higher ambient temperatures. This is a feature that neither the X-T50 nor the X-T50 have. Additionally, there are 'Long Play' modes for 4K DCI/UHD and 2K DCI/UHD which employ crop (1.18x and 1.29x respectively) to help reduce the rate of temperature increase during recording, but obviously at the cost of a slight reduction in image quality. The X-M5 is the first X mount body to have a trio of built-in microphones which enable the adjustment of the pick-ups patterns for more 'spacious' sound. There are four settings – Surround, Front Priority, Back Priority, or Front & Back Priority.

The headline act is 6.2K res video at 25/30 fps with 10-bit 4:2:2 colour using the H.265 codec with LongGOP compression. Both 4K DCI and 4K UHD are recorded using the full width of the sensor and you can have either 10-bit 4:2:2 colour with the HEVC H.265 codec or 8-bit 4:2:0 colour with MPEG 4 AVC/H.264, both with Long GOP compression. The same options are all available with 2K recording plus slowmo frame rates up to 200/240 fps which comes with a 1.29x crop. Because of the lower-res sensor, the X-M5 doesn't have all the cropping limitations of the X-T50. For the same reason, the bit rates top at a lower 200 Mbps, but there are settings down to 8.0 Mbps to give smaller file sizes which obviously comes at the cost of image quality, but will be sufficient for applications such as social media.

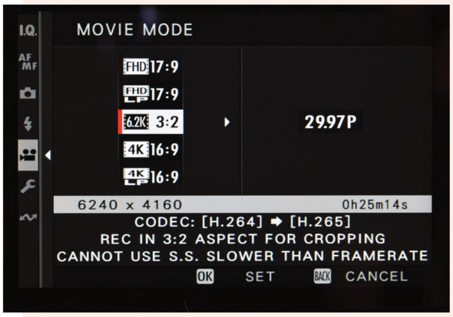
Like the X-T50, the X-M5 only has a single memory card slot, but again 'Frame.io Camera to Cloud' support overcomes some of the limitations as, for example, it can be used to send video proxies while recording the source footage.

Pretty well all the X-M5's photo functionality is also available for video including all the 'Film Simulation' profiles and their adjustment parameters, the monochromatic colour adjustments, the dynamic range expansion processing and high ISO noise reduction plus there's a video-only correction for lens vignetting. The video-specific features include a choice of zebra patterns with adjustable brightness thresholds, time coding and electronic IS to compliment the IBIS (but which introduces a small crop).

The current-spec Fujifilm autofocusing works very well with video, giving reliable focus tracking in general – including with the eye/face detection for people – and excellent lock-on characteristics with the AI-based subject recognition. Furthermore, tracking can be initiated by simply tapping on the subject in the touch screen and the camera will then follow any subsequent movement.

For video too, there's an additional manual focus assist called the 'Focus Meter' which has provides an indicator needle to show whether the focus is in front of or behind the subject. Additionally, it can be used in conjunction with the focus peaking display which is even more helpful.

Overall, the X-M5 is a more accomplished video camera than either the X-T50 or the X-T5, but Fujifilm does offer the more video-orientated X-S20 which uses the same sensor and does have an EVF along with many more higher-end features. However, once again, it's significantly more expensive so the reduced dimensions and the even more significantly reduced dollars still make the X-M5 an appealing proposition.



29.97P

6240 x 4160 0h25m14s

CODEC: [H.264] ➡ [H.265]

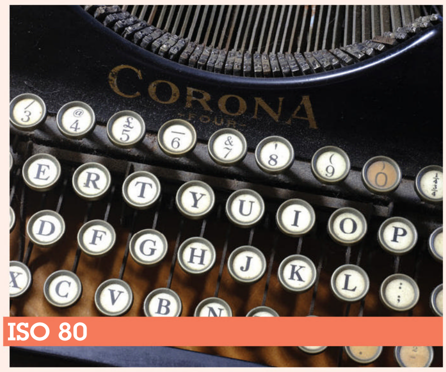
REC IN 3:2 ASPECT FOR CROPPING

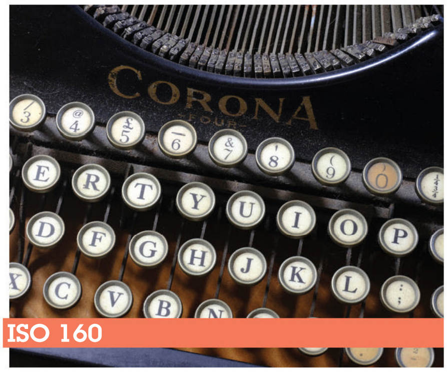
CANNOT USE S.S. SLOWER THAN FRAMERATE

▲ Not surprisingly, the X-M5 is a very capable video camera and can record at up to 6.2K at 25/30 fps with the option of a RAW output via HDMI.

RANDOM
HARVEST.
Australian gourmet
— EST. 1981 —
Fizzy Sherbet
sorted Fruit

AURANGE


ISO 80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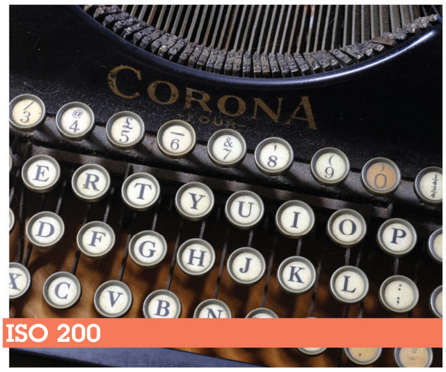
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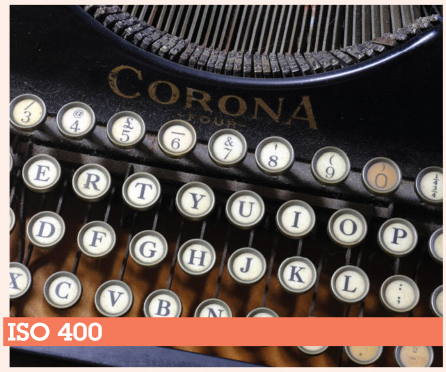
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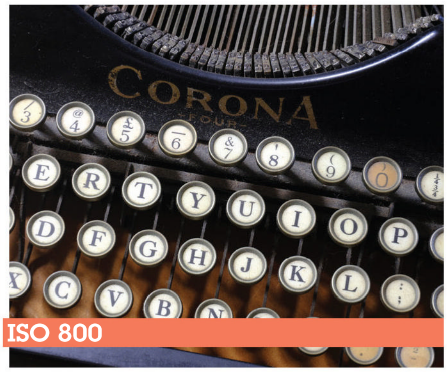
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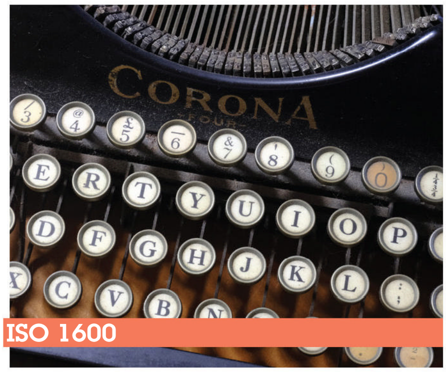
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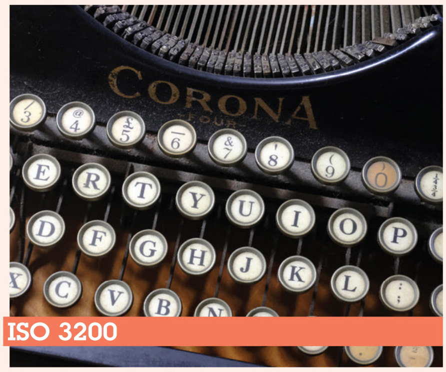
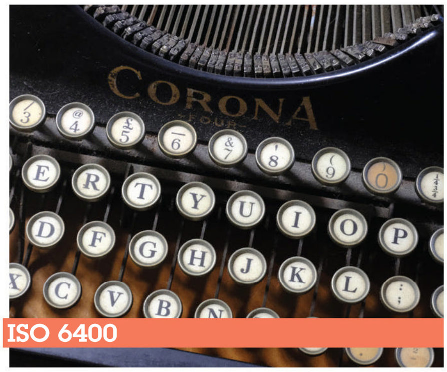
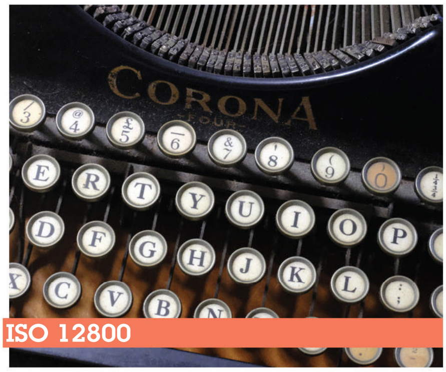
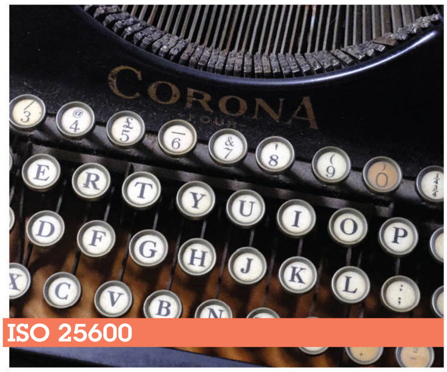
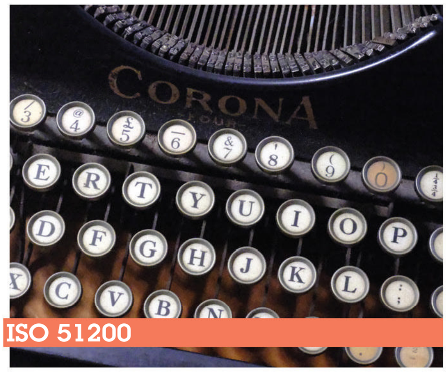

ISO 3200


ISO 6400


ISO 12800


ISO 25600


ISO 51200

▲ The X-M5's sensor has a native sensitivity range spanning ISO 160 to 12,800 with extensions either side down to ISO 80 and up to ISO 51,200. The sensor's pixel-level 'dual gain' circuitry gives two base ISO settings – at 160 and 800 – with the result that noise is markedly reduced at the higher sensitivity settings above ISO 800. Consequently, the full native ISO range is useable, and the image quality remains good even at all the higher extension settings too. These test images are JPEG/large/fine files taken in the aperture-priority auto exposure mode with the aperture set to f/11 so the exposure time varies to compensate for the adjustments to ISO. Both High ISO and Long Exposure noise reduction are switched off. Fujinon XC 14-45mm f/3.5-5.6 OIS PX power zoom.

◀ Test images captured as JPEG/large/fine files with the Fujinon XC 14-45mm f/3.5-5.6 OIS PX and the XF 16-55mm f/2.8 R LM WR zoom lenses. Velvia/Vivid and ACROS+Red 'Film Simulation' presets, shutter-priority auto exposure control and multi-zone metering at either ISO 400 or ISO 1600. Straight out of the camera these images exhibit plenty of crisply-defined fine detailing, smooth tonal gradations and a wide dynamic range. As always, Fujifilm's 'Film Simulation' profiles provide plenty of scope for tuning the colour and tonality to taste.

gradually increase in size from Single-Point (adjustable to one of six sizes), to Zone (selectable in 7x7, 5x5 or 3x3 point clusters selected from the 117 points) and then to Wide. There's also an 'All' setting which allows you to cycle through these three modes via the rear input wheel. Additionally, you can customise the Zone areas. With continuous AF operation, the area modes are Single-Point, Zone, Tracking and All. As is now a fixture on both X and G mount Fujifilm cameras, the 'AF-C Custom' submenu provides a set of five scenarios for fine-tuning tracking based on how the subject is moving and via three parameters – Tracking Sensitivity, Speed Tracking Sensitivity and Zone Area Switching – or there's a sixth option for creating your own customised configuration.

There's another couple of Fujifilm 'staples' provided in the choices of assists for manual focusing, namely the 'Digital Split Image' and 'Digital Microprism' displays. These are 'virtual' representations of,

X-M5
FUJINON ASPHERICAL LENS
SUPER EBC XC 15-45mm 1:3.5-5.6 OIS PZ Ø52

respectively, the split-image rangefinder and the gridded collar or ring which surrounded it in a traditional reflex camera's optical viewfinder. The 'Digital Split Image' display can be in either colour or B&W, but latter actually makes it easier to see what's going on. Frankly, in practice the focus peaking display is much easier to use and is available in the choice of red, white, blue or yellow, each with two intensity levels.

Exposure control is based TTL metering using the imaging sensor with 256 measuring points and the choice of multi-zone, centre-weighted average, fully averaged or spot patterns. The spot meter can be linked to the active focusing point or zone. Additionally, the metering will be tuned to type of subject selected with subject-recognition AF. There's the standard set of 'PASM' exposure control modes and, as with the AF subject recognition, in the camera's full Auto mode you can leave the camera to work out what it's looking at and set the appropriate subject mode.

For those who like to have more input, there's an AE lock, exposure compensation for up to +/-5.0 EV and, as mentioned earlier auto bracketing which can applied over sequences of two, three, five, seven or nine frames with adjustments of up to +/-3.0 EV per frame. The focal plane shutter has a speed range of 15 minutes up to 1/4000 second, and the sensor shutter runs up to 1/32,000 second. The hybrid 'electronic first curtain shutter' (EFCS) also has a range of 900-1/4000 second and, of course, allows for flash usage which using the sensor shutter alone does not. However, you can mix-and-match various combinations of shutters and the switchover is performed automatically.

The white balance control options comprise three auto modes – Auto, White Priority and Ambience Priority – with the latter two primarily for use with incandescent light sources to either correct for, or preserve, the warmer tones. Alternatively, there's a choice of seven lighting presets (including one for shooting underwater), the provision for making and storing up to three custom measurements, white balance shifting in all modes and presets, and the previously-mentioned auto bracketing which is over three frames. Finally, there's manual colour temperature setting over a range of 2500 to 10,000 degrees Kelvin.

## IN THE HAND

T'is a pretty looking little thing with good proportions and clean, simple RF-like styling. The bodyshell is magnesium alloy so, despite the compact dimensions, the X-M5 still feels pretty solid. As with the X-T50, there's no weather sealing, but similar to this model, there's a dedicated dial for the 'Film Simulation' settings. This allows you to change 'Film Simulation' profiles on-the-fly without needing to continually revisit the main IQ menu. There are eight positions for all the photo staples – including Provia/Standard, Velvia/Vivid, Astia/Soft, Classic Chrome, Classic Neg and ACROS B&W – plus a further three 'FS' settings that can be assigned to whichever profiles you'd like to add. Additionally, you can modify the ACROS setting to any of the contrast filter options. There's also a 'C' which will take you to whichever 'Film Simulation' profile you've set in the IQ menu.

The top panel control layout also comprises a main mode dial, front/rear input wheels, a video start/stop button and, bit surprisingly for this model, the shutter release still has a cable-release socket. The rear panel keeps things very simple indeed with a joystick controller and a small number of function buttons, including one for the drive settings. This also gives you access to the auto bracketing modes, multi-shot HDR capture, the multiple exposure facility, the 'Advanced Filter' effects and the in-camera panorama stitching.

Three buttons are customisable and there's the usual set of four 'Touch Functions' ('T-Fn') which use left, right, up and down swipe actions on the monitor's touch screen to select assigned functions. You can assign pretty well anything that the X-M5 can do – there's nine menu pages of items in all – to these four actions. Additionally, by pressing the front input wheel you can cycle through a selection of functions including setting the shutter speeds, ISO, exposure compensation and the 'Film Simulation' profiles (and these vary with each exposure mode). The rear wheel is also customisable, but only to whichever function you select.

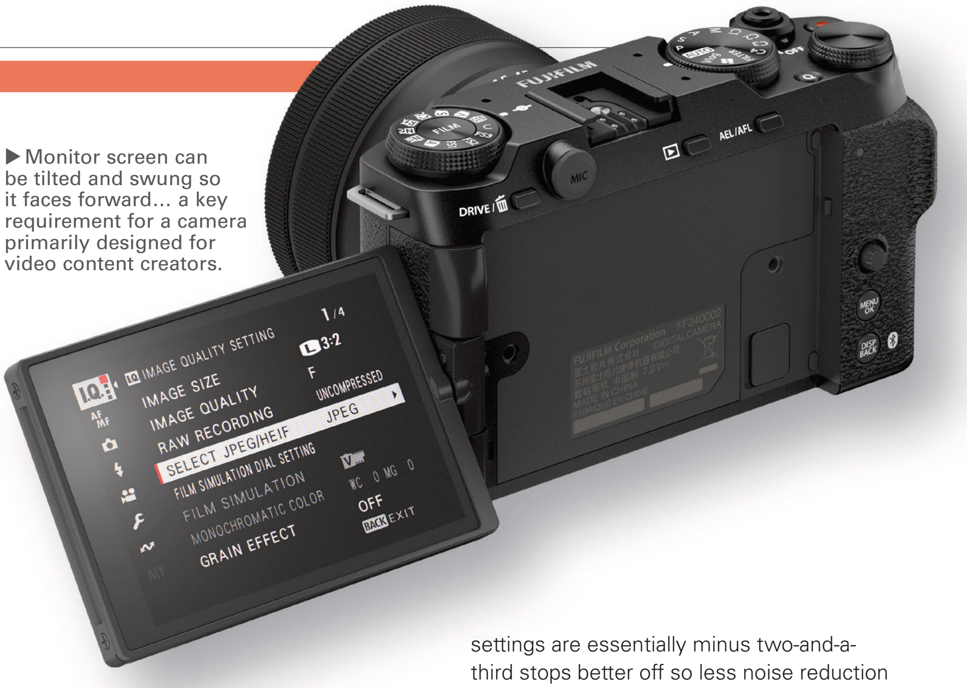
The touch screen implementation includes focus point/zone/face selection and, for playback, there are touch controls for browsing, zooming in or out (which also selects the thumbnail pages), or zooming in on the active focus point/zone. With the power zoom lens fitted, there's also a Touch Zoom function.

However, also as usual on a Fujifilm X mount camera, the main menus aren't included in the touch controls and are navigated via the joystick controller along with the front and rear input wheels. However, the camera's 'Quick Menu' screen makes up for it, enabling faster access to 15 functions by simply tapping on the

> THE 'X-TRANS CMOS 4' SENSOR IS ALSO A KNOWN QUANTITY AND CERTAINLY HELPED SELL PLENTY OF X-T4S, X-T30S AND X100VS."

X-M5
FUJINON ASPHERICAL LENS
SUPER EBC XC 15-45mm 1:3.5-5.6 OIS PZ Ø52
FUJIFILM
LOCK
STILL
T
W
MOVIE

▲The X-M5 on the optional TG-BT1 grip/tripod which pairs to the camera for wireless Bluetooth functionality.



▶ Monitor screen can be tilted and swung so it faces forward... a key requirement for a camera primarily designed for video content creators.

appropriate tile. Furthermore, up to seven 'Custom Settings Banks' can be created as additional 'Quick Menus' which, for example, you might use for specific subjects or shooting situations. There's also a video-specific 'Quick Menu' screen.

The monitor screen itself is fully adjustable for tilt and swing – and can be faced fully forward which is obviously a key requirement for a vlogging camera – and has a resolution of 1.04 megadots. The display itself is adjustable for colour balance and colour saturation.

The live view screen can also be extensively customised with the key elements comprising 3x3 or 4x6 guide grids, a real-time histogram (either brightness only, or with the RGB channels as well), level indicators – either single- or dual-axis displays – and a highlight warning (or you can use video's zebra patterns which have an adjustable threshold and so can be more helpful). There's a long list of available read-outs and status indicators and you simply tick the boxes in the 'Display Custom Setting' submenu. Additionally, you can increase the size of selected icons and also adjust the display contrast to enhance legibility in different lighting conditions. This includes a 'Dark Ambient Lighting' setting for shooting at night so the displays don't affect your night vision.

The X-M5 is powered by the 1260 mAh NP-W126S lithium-ion battery which also is used in the X-T50 and its predecessors. Fujifilm quotes 440 shots when the camera is the Economy power mode (a number which benefits from not having an EVF running). This drops to 330 shots in the Normal mode.

In-camera battery recharging is available via the USB Type C port which also allows for Webcam video streaming at up to 4K 50/60 fps. The other interfaces are micro HDMI (i.e. Type D) and standard 3.5mm minijacks for an external stereo microphone and headphones.

The alternative, of course, is to use the wireless connectivity for this via a smartphone or tablet running the Fujifilm XApp which allows for both image file transfer and remote control of the camera. Like the X100VI and the X-T50, the X-M5 also supports the 'Frame.io Camera to Cloud' cloud service so high-res images and video clips can be directly and immediately uploaded to Adobe's Frame.io software platform (but you'll need to create an account).

## SPEED AND PERFORMANCE

Using a SanDisk Extreme Pro 64 GB SDXC UHS-II memory card and the focal plane shutter, the X-M5 captured a burst of 117 JPEG/large/fine frames in 14.608 seconds which is bang-on 8.0 fps. Using the sensor shutter, a sequence of 156 best-quality JPEGs (uncropped) was fired off in 7.632 seconds which equates to a speed of 20.44 fps. The test files averaged around 15.6 MB in size.

We've already experienced the AF performance in the X-T50 and the X100VI, and it works just as effectively here, with the latest control algorithms delivering excellent tracking reliability with objects that are fast moving and/or changing direction or speed erratically. The eye/face detection for humans copes still snaps onto smaller-sized heads and then stays locked-on if the subject happens to look away or look down briefly. As we noted with the X-T50, the low-light/contrast performance is also very good so the AF works reliability into near-darkness.

The 'X-Trans CMOS 4' sensor is also a known quantity and certainly helped sell plenty of X-T4s, X-T30s and X100Vs. The 26.1 million pixels count is still arguably a sweet spot for an 'APS-C' format, sensor balancing resolution and pixel size, the latter to the benefit of a higher signal-to-noise ratio and all that follows on from this in terms of image quality. Consequently, the big JPEGs straight out of the X-M5 deliver lots of crisply-defined fine detailing, very smooth tonal gradations and a wide dynamic range. As always, the 'Film Simulation' profiles provide plenty of scope for playing with colour and tonality, and here Fujifilm remains unchallenged in its ability to balance colour saturation and tonality to create a specific look (although the rest of the camera world is starting to wake up).

Furthermore, this sensor has a dual-gain output which means it essentially has two base ISOs – in this case, at ISO 160 and ISO 800. The low ISO circuit optimises dynamic range and the high ISO circuit optimises sensitivity (i.e. the signal level) which results in some reduction of the dynamic range (at the highlights end), but reduced noise in the shadows. Consequently, here the noise characteristics at the higher sensitivity settings are essentially minus two-and-a-third stops better off so less noise reduction processing is required to the benefit of both sharpness and saturation at the higher ISO settings. Theoretically then, the IQ at ISO 4000 will be pretty much the same as it is at ISO 800, albeit with some reduction in dynamic range. In terms of image quality, the entire native ISO range is useable, as there's a negligible loss of definition at ISO 12,800 and only minimal softening at ISO 25,600. The dual gain design also gives more flexibility when it comes to exposures as, for example, there's actually a less noise at ISO 800 or 1600 than at ISO 400. This means more latitude if you're deliberately using underexpose in order to preserve more details in the highlights and then subsequently brightened the shadows... which will consequently be less noisy.

## THE VERDICT

If you aren't among the apparently fast-growing brigade of video content creators, the X-M5 arguably has a few red crosses alongside it, topped by the absence of an EVF, but also no IBIS and no weather sealing. These are undoubtedly biggies for many shooters, but if you then take a look at the ticks, the camera does plenty to help stay in the game – great looks, compact dimensions, good ergonomics, excellent AF performance, all the 'Film Simulation' profiles, and an superb image quality. And then it really does punch above its weight when it comes to its video capabilities and IQ... so there really is a lot to like. There's no question that the monitor screen can be difficult to use in bright, sunny conditions, but the more we used the X-M5, the more we appreciated all it could do for such a small camera. And, more importantly, how it can work well for applications other than desk-top video. Fujifilm has obviously been careful not to stray too far from the main design brief, but in giving the X-M5 the feature set that it has, it has created a camera that's a whole lot more versatile than was probably original intended. If it ticks most or all of your boxes, you're onto a winner.

## VITAL STATISTICS

## FUJIFILM X-M5 $1449

body only, recommended retail price

**Type:** Compact digital mirrorless camera with Fujifilm X bayonet lens mount.

**Focusing:** TTL automatic hybrid system using phase-difference detection and contrast-detection measurements. 425 measuring points (in 25x17 or 13x9 patterns). Single-point (six sizes), zone (7x7, 5x5 or 3x3 point clusters selected from 117 points), custom zone (three user-defined shapes) and wide/tracking modes. Five 'AF-C Custom' settings for optimising tracking plus a user-definable setting for Tracking Sensitivity, Speed Tracking Sensitivity and Zone Area Switching. Face/eye detection with left/right priority. Subject detection for animals, birds and insects, cars, motorcycles and bikes, aircraft and drones, and trains. Auto subject detection when the camera is in full auto mode. Focus range limiter. Face/eye detection with left/right priority. Manual switching between one-shot and continuous AF modes. AF+MF mode. Low-light assist via built-in illuminator. Manual focus assist via magnified image, 'Digital Split Image' display (colour or B&W), 'Digital Microprism' display, or focus peaking display (white, red, blue or yellow; low or high levels). Sensitivity range is EV -7.0 - 18 (ISO 100 and f/1.0).

**Exposure Modes:** Continuously-variable program with shift, shutter-priority auto, aperture-priority auto and metered manual. 14 subject/scene modes. Automatic subject/scene mode selection (12 modes) in the 'Auto' mode.

**Shutter:** Electronic, vertical travel, metal blades, 900-1/4000 second plus 'B' (up to 60 minutes). Flash sync up to 1/180 second. Sensor shutter has a speed range of 900-1/32,000 second. Exposure compensation up to +/-5.0 EV in 1/3-stop increments.

**Viewfinder:** No built-in viewfinder. 7.62 cm LCD monitor with 1.04 megadots resolution, tilt/swing adjustment and touch screen controls. Both EVF and monitor adjustable for brightness, colour saturation and colour balance.

**Flash:** No built-in flash. External flash units connect via hotshoe.

**Additional Features:** Magnesium alloy bodyshell, AE/AF lock, auto exposure bracketing (up to +/-3.0 EV over two, three, five, seven or nine frames), multi-mode self-timer (2 and 10 second delays), audible signals, auto power-off, cable release connection, wired remote trigger connection.

### DIGITAL SECTION

**Sensor:** 26.1 million (effective) pixels 'X-Trans CMOS 4' (BSI-type CMOS) with 23.5x15.6 mm imaging area and 3:2 aspect ratio. Sensitivity equivalent to ISO 160-12,800, extendable to ISO 80, 100, 25,600 and 51,200.

**Focal Length Magnification:** 1.5x.

**Formats/Resolution:** Two JPEG compression settings, two HEIF compression settings, RAW output (compressed, lossless compressed or uncompressed), RAW+JPEG and RAW+HEIF capture. Three resolution settings at 3:2 aspect ratio; 6240x4160, 4416x2944 and 3120x2080 pixels. Three resolution settings at 16:9 aspect ratio; 6420x3512, 4416x2488 and 3120x1760 pixels. Three resolution settings at 1:1 aspect ratio; 4160x4160, 2944x2944 and 2080x2080 pixels. 24-bit RGB colour for JPEGs, 30-bit colour for HEIFs, 42-bit RGB colour for RAW files.

**Video Recording:** MOV format with 10-bit 4:2:2 or 4:2:0 colour (HEVC/H.265 codec, LongGOP compression) at 6240x3510 pixels (6.2K); 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 16:9 aspect ratio. At 4096x2160 pixels (4K DCI); 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio. At 4096x2160 pixels (4K DCI); 60 or 50 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio and 1.18 crop. At 3840x2160 pixels (4K UHD); 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio. At 4096x2160 pixels (4K DCI); 60 or 50 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio and 1.18 crop.

At 2048x1080 pixels (2K DCI) at 60, 50, 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio. At 1920x1080 pixels (2K FHD) at 60, 50, 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 16:9 aspect ratio. At 1080x1920 pixels (2K FHD) at 60, 50, 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 9:16 aspect ratio. At 1920x1080 pixels (2K FHD) at 240, 200, 120 or 100 fps (200 Mbps) and 16:9 aspect ratio with a 1.29x crop. At 1080x1920 pixels (2K FHD) at 240, 200, 120 or 100 fps (200 Mbps) and 9:16 aspect ratio and a 1.29x crop.

**MOV format with 8-bit 4**:2:0 colour (MPEG 4 AVC/H.264 codec, LongGOP compression) at 4096x2160 pixels (4K DCI); 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio. At 4096x2160 pixels (4K DCI); 60 or 50 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio and 1.18 crop. At 3840x2160 pixels (4K UHD); 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio. At 4096x2160 pixels (4K DCI); 60 or 50 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio and 1.18 crop.

At 2048x1080 pixels (2K DCI) at 60, 50, 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio. At 1920x1080 pixels (2K FHD) at 60, 50, 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 16:9 aspect ratio. At 1080x1920 pixels (2K FHD) at 60, 50, 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 9:16 aspect ratio. At 1920x1080 pixels (2K FHD) at 240, 200, 120 or 100 fps (200 Mbps) and 16:9 aspect ratio with a 1.29x crop. At 1080x1920 pixels (2K FHD) at 240, 200, 120 or 100 fps (200 Mbps) and 9:16 aspect ratio and a 1.29x crop.

**MP4 format with 8-bit 4**:2:0 colour (MPEG 4 AVC/H.264 codec, Long GOP compression) at 4096x2160 pixels (4K DCI); 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio. At 4096x2160 pixels (4K DCI); 60 or 50 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio and 1.18 crop. At 3840x2160 pixels (4K UHD); 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio. At 4096x2160 pixels (4K DCI); 60 or 50 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio and 1.18 crop.

At 2048x1080 pixels (2K DCI) at 60, 50, 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 17:9 aspect ratio. At 1920x1080 pixels (2K FHD) at 60, 50, 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 16:9 aspect ratio. At 1080x1920 pixels (2K FHD) at 60, 50, 30, 25 or 24 fps (8.0, 25, 50, 100 or 200 Mbps) and 9:16 aspect ratio. At 1920x1080 pixels (2K FHD) at 240, 200, 120 or 100 fps (200 Mbps) and 16:9 aspect ratio with a 1.29x crop. At 1080x1920 pixels (2K FHD) at 240, 200, 120 or 100 fps (200 Mbps) and 9:16 aspect ratio and a 1.29x crop.

Three built-in microphones with a choice of pick-up patterns. Auto/manual levels adjustment, limiter, wind-cut filter, low-cut filter 'Steady State' noise reduction. Stereo audio input (switchable mic/line levels) and stereo headphone output with adjustable volume.

**Video Features:** Long play recording modes (4K DCI/UHD and 2K DCI/UHD) to reduce heat build ups, video subject tracking via touch screen, Long GOP or All-Intra compression, F-Log and F-Log2 gamma profiles, HLG HDR recording, time code (free run or rec run, drop frame correction), digital image stabilisation, HDMI rec control, focus peaking display, two zebra patterns with adjustable brightness threshold, 'Movie Optimised Control' for silent operation via touch screen, front and rear tally lamps, 9:16 aspect short clips mode (up to 60 seconds), Vlog mode with dedicated touch screen interface and dedicated shooting modes (Portrait Enhancer, Product Priority and Background Defocus). Compatible with Fujifilm's FAN-001 cooling fan and Tripod Grip TG-BT1.

**HDMI Output:** ProRes RAW 6.2K 16:9 with 10-bit 4:2:2 colour and 30, 25 or 24 fps. Blackmagic RAW 6.2K 16:9 and 6.2K 16:9 with 10-bit 4:2:2 colour and 30, 25 or 24 fps. 6.2K with 10-bit 4:2:2 colour and 30, 25 or 24 fps. ProRes RAW 5.2K 16:9 with 10-bit 4:2:2 colour and 60, 50, 30, 25 or 24 fps. Blackmagic RAW 5.2K 16:9 and 6.2K 16:9 with 10-bit 4:2:2 colour and 60, 50, 30, 25 or 24 fps. 4K DCI 17:9 with 10-bit 4:2:2 colour and 60, 50, 30, 25 or 24 fps. 4K UHD 16:9 with 10-bit 4:2:2 colour and 60, 50, 30, 25 or 24 fps. Full HD 16:9 or 17:9 with 10-bit 4:2:2 colour and 60, 50, 30, 25 or 24 fps. High Speed Rec HDMI; Full HD 16:9 with 10-bit 4:2:2 colour and 120 or 100 fps.

**Recording Media:** Single memory card slot for SD, SDHC and SDXC with UHS-I speed support.

**Continuous Shooting:** Up to 173 JPEG/large/fine frames at up to 8.0 fps or 82 RAW (compressed) frames using the focal plane shutter. Up to 127 JPEG/large/fine frames at 20 fps or 60 RAW (compressed) frames using the sensor shutter. Low speed continuous mode captures at 4.0 or 5.0 fps with continuous AF/AE adjustment. Up to 128 JPEG/large/fine frames at 30 fps or 78 RAW (compressed) frames using the sensor shutter with a 1.25x crop. 'Pre-Shot' pre-capture buffering at 10, 20 or 30 fps for one second.

**White Balance:** TTL measurement. Three auto modes, seven presets and three custom settings. White balance shifting/tuning in all modes and presets, and white balance bracketing. Manual colour temperature setting from 2500 to 10,000 degrees Kelvin. Auto White Priority maintains whites under incandescent lighting. Auto Ambience Priority maintains warmer hues under incandescent lighting.

**Interfaces:** USB 3.2 Gen 2 (Type C), micro HDMI (Type D), 3.5mm stereo audio input (mic/line level) and 3.5 mm stereo audio output.

**Additional Digital Features:** Sensor cleaning, 20 'Film Simulation' presets (Provia/Standard, Velvia/Vivid, Astia/Soft, Classic Chrome, Nostalgic Neg, Pro Neg High, Pro Neg Standard, Classic Neg, Reala Ace, Eterna/Cinema, Eterna Bleach Bypass, ACROS, ACROS+Yellow, ACROS+Red, ACROS+Green, B&W, B&W+Yellow, B&W+Red, B&W+Green, Sepia), adjustable image parameters (Tone Curve – Highlight/Shadow, Colour Saturation, Sharpness, Clarity and Monochromatic Colour – warm-to-cool or green-to-magenta), 'Colour Chrome Effect' (Strong, Weak, Off), 'Colour Chrome Effect Blue' (Strong, Weak, Off), 'Grain Effect' (Roughness: Strong, Weak, Off. Size: Large, Small), eight 'Advanced Filter' effects (Toy Camera, Miniature, Pop Colour, High-Key, Low-Key, Dynamic Tone, Soft Focus and Partial Colour [Red/Orange/Yellow/Green/Blue/Purple]), multi-shot HDR capture (Auto, HDR200, HDR400, HDR800, HDR800 Plus), multiple exposure facility (up to nine shots with Additive/Average/Bright/Dark exposure adjustment), flicker detection and correction, pixel mapping, 'Lens Modulation Optimiser' (LMO) processing, intervalometer (up to 999 frames), dynamic range expansion (Auto, 100%, 200%, 400%), in-camera panoramas, 'Quick Menu' control screen, seven custom 'Quick Menu' settings banks, real-time histogram display, dual-axis level display, grid displays (choice of two), guidance displays, in-camera panoramas (120 or 180 degrees), bracketing functions (AE, Film Simulation, Dynamic Range, ISO, White Balance, Focus), in-camera lens corrections (Distortion, Colour Shading, Peripheral Illumination), in-camera panorama stitching, high ISO noise reduction (plus/minus four levels), long exposure noise reduction (On/Off), sRGB and Adobe RGB colour space settings, in-camera editing functions (RAW Conversion [18 adjustable parameters], Erase, Crop, Resize, Protect, Image Rotate, Red-Eye Removal, Copy, PhotoBook Assist), slide show, multi-image playback, 9/100 thumbnail displays, zoom playback, silent mode, Instax Print (WiFi models only), customisable 'My Menu' (16 items), copyright info, WiFi and Bluetooth 4.2 LE wireless connectivity, 'Frame.io Camera to Cloud' support, DPOF support.

**Power:** One 7.2 volt/1260 mAh rechargeable lithium-ion battery pack (NP-W126S type). In-camera battery charging via USB C.

**Dimensions (WxHxD):** body only = 123.8x84.0x86.8 mm.

**Weight:** 389 grams body only (without battery or memory card).

**Price:** $1449 body only or $1649 with the Fujinon XC 15-45mm f/3.5-5.6 OIS PZ zoom Choice of silver or black finishes. Fujifilm Australia provides a three-year warranty for X series mirrorless cameras and XC/XF lenses purchased in Australia from an authorised reseller.

**Distributor:** Fujifilm Australia, telephone (02) 9466 2600 or visit www.fujifilm.com.au

Photo: Ian van der Wolde

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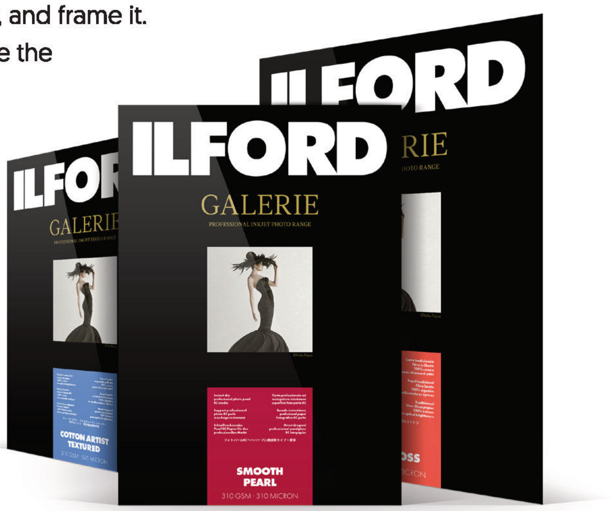
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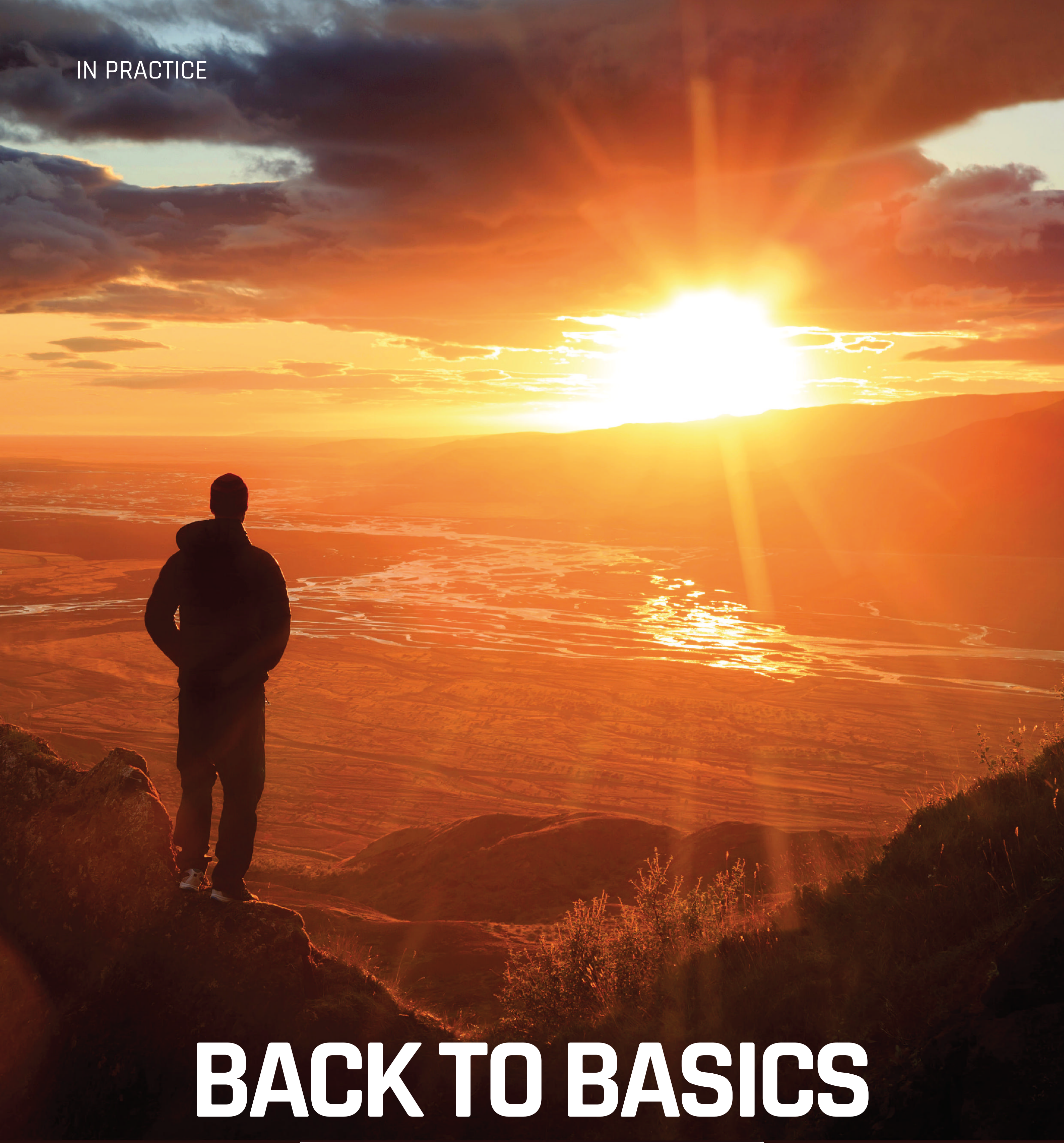


# BACK TO BASICS

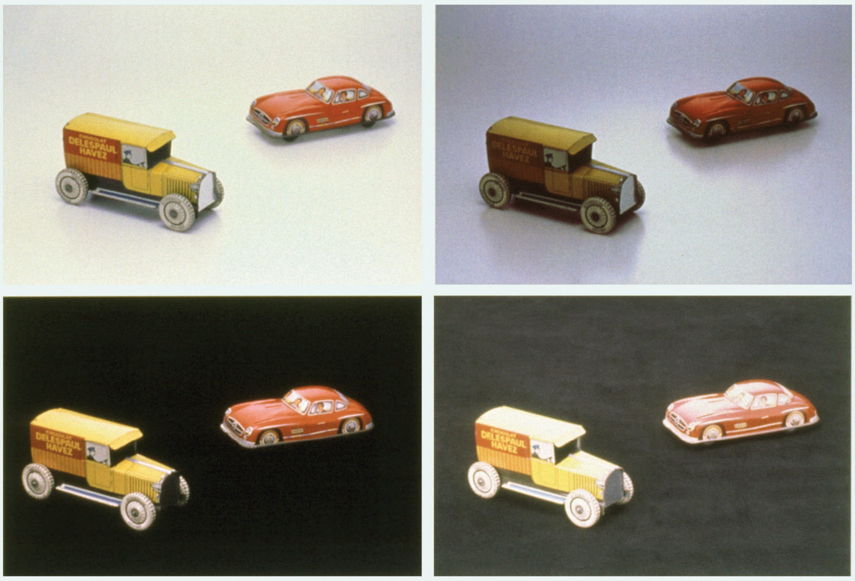
## ALL ABOUT EXPOSURE CONTROL

Every few years we go back to... Back To Basics. Understanding the fundamental principles behind how your camera works is the key to achieving the results that you really want. This series drills down to the all key elements of cameras and lenses, and how you can make them work for you.

No matter how advanced or sophisticated camera automation becomes, if you don't know what's going on behind-the-scenes, you're not in control and that means you aren't always going to get the results you're expecting. It's the reason that even the very latest mirrorless cameras still have manual overrides for just about everything… sometimes you will need to take over. But first you need to know what you're doing which means, firstly, knowing when to use these controls and, secondly, how to use them to make the camera do exactly what you want. So let's start with the most basics of basics… exposure control.

Controlling exposure is the essential ingredient of making photographs, but if you leave it entirely to the camera, you'll be missing out on some vital creative possibilities. The various manual controls for adjusting exposures are some of the most powerful pictorial tools on your camera, both technically and creatively.

Translated from Greek, the word *photography* means 'drawing with light' and the essence of creating a photographic image lies with controlling exactly how much light reaches the recording medium, whether it's a digital imaging sensor or a frame of film. Logically, this is called an 'exposure' (i.e. the recording medium is *exposed* to light) and in any camera, it's essentially regulated by three controls – lens apertures, shutter speeds and the sensitivity – or ISO – settings. However, before we look at these key controls in detail, let's first look at how your camera determines just how much light it – and you – have to work with.



These four images illustrate the limitations of light metering systems. In the top two frames, the model cars are on a white background and the exposure at top right is what happens when the metering sets an exposure which renders the background as a mid-tone… consequently, the image is underexposed. Deliberate overexposure has to be applied to give the better exposure at top left.

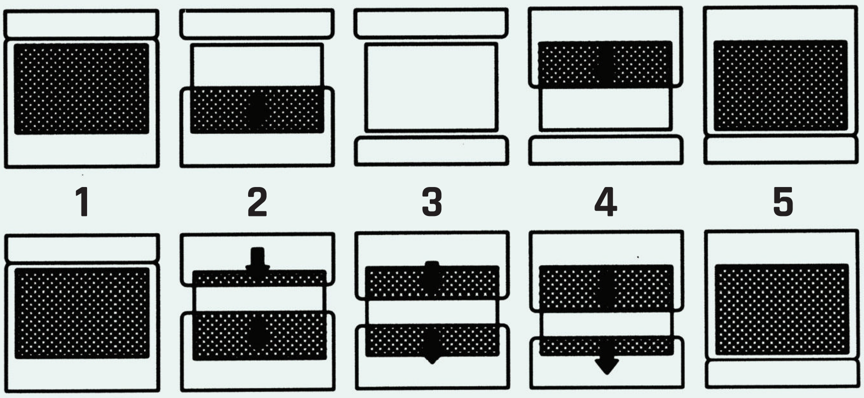
In the bottom two frames, the model cars are on a black background and the exposure at bottom right is what happens when the metering again sets an exposure which renders the background more as a mid-tone… consequently, the image is overexposed. Deliberate underexposure has to be applied to give the better exposure at bottom left.

## Light Metering

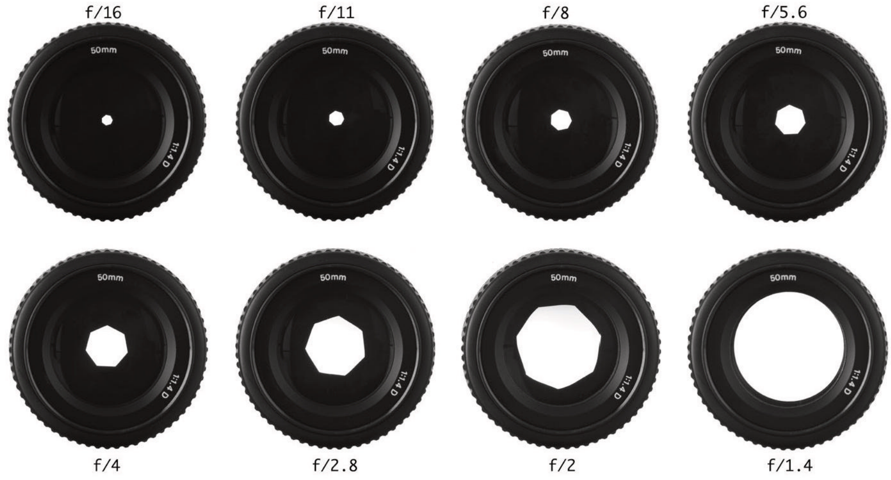
All exposure control deliberations start with the camera's built-in light meter – often also called an exposure meter – which measures the amount of light being reflected off the subject or scene and then passing through the lens to reach the sensor or film. This is generally referred to as TTL metering. DSLRs mostly employ a separate sensor for light metering while mirrorless cameras (and also fixed-lens models) use the pixels on the imaging sensor.

What's important to know about a light meter of any sort is that the information it gives you is often only a starting point for determining exposure settings, and you may also have to apply some subjective judgements based on your personal evaluation of the subject and/or the lighting situation. In terms of the exposure settings it recommends, all the meter can do is tell you how much light is available overall, but nothing about the brightness range within the scene (known as contrast) or where the areas of brightness and darkness occur and how much of the frame they account for. This is where you need to learn evaluate the scene to determine whether the meter's recommendations will need modifying or overriding using one of the camera's manual exposure controls. This may well be necessary if you want to be creative with your exposure control (for example, deliberately under- or overexposing to give a particular visual effect).

Any camera exposure meter ultimately arrives at a light reading that represents an average of all the brightness levels contained within the viewfinder frame. Some metering modes are cleverer than others, but the output is still the same… a value that represents a mid-tone equal to an 18 percent grey tone. Exposure meters don't 'see' colours, but some have some a degree of colour sensitivity based the comparative greyscale value, but they still arrive at a single exposure value which determines the aperture and/or shutter speed settings. Depending on the contrast characteristics of the scene, this may or may not be



Focal plane shutter operation sequences – at slower speeds (top) the shutter blades will open completely (top, 3), but at faster speeds the frame is essentially scanned by a slit (lower 2, 3 & 4) so the shutter is never fully open. This is why FP shutters have a maximum speed for flash synchronisation, otherwise part of the frame will be obscured when the flash fires. The maximum flash sync speed on most mirrorless cameras and DSLRs is usually between 1/125 and 1/250 second.



▲ Aperture settings control the amount of light reaching the imaging sensor. As the diaphragm progressively closes down each aperture setting – which represents one stop of adjustment – lets in half the amount of light as the previous one. Note that larger f-numbers represent smaller apertures.

▲The classic shutter speed dial can be found on a number contemporary mirrorless cameras. The 'halves/doubles' relationship between full-stop settings again applies so, for example, 1/125 second doubles the exposure from 1/250 second.

▲The 'halves/doubles' relationship between full-stop settings also applies to the ISO – or sensitivity settings – so, for example, ISO 400 is twice as sensitive as ISO 200. On this dial, one-third stop setting positions are also provided.

▲The manual aperture collar is also making a return mainly due to the demands of video-makers. However, many interchangeable lenses don't this control and manual aperture adjustments are made from the camera body. Full-stop settings are marked here – from f/1.4 to f/16 – but half-stop or even third stop adjustments can be possible. Lenses that are also aimed at video-makers allow for the aperture ring to be switched from click-stopped settings to seamless adjustment for more precise control over exposures.

▲ A quick and easy way to override the camera's auto exposure control is via the exposure compensation facility. Dialling in plus settings increases the exposure, the minus settings decrease it. Many photographers leave the dial set to give a small amount of underexposure in order to avoid washing out the brighter highlights and losing detail).

'correct'. And here's the most important point to make about exposure control… it's rarely about being technically correct, it's about either what looks right in terms of the image's brightness or the particular visual effect that you wanted to achieve (which could either be underexposed or overexposed compared to the so-called 'correct exposure').

To illustrate, if you pointed the meter at a white cat, the exposure settings it recommends would actually give you an 18 percent grey cat… because white is brighter than the average value so the camera determines that less exposure is needed. Likewise, if you point it at a black cat, and then used the exposure settings recommended by the camera, you'd also end up with an 18 percent grey cat as black is darker than the average so the exposure is increased. So, consequently, if you want the white cat to be reproduced as white, you'd need to deliberately overexpose – relative to the exposure settings recommended by the camera – and if you want the black cat to be rendered as black in your photograph, you'd need to deliberately underexpose.

Here then, is a basic rule for metering; pick a tone in the scene that either is 18 percent grey (or close to it) or, more importantly, that you *want* to be 18 percent grey… and use this measurement on which to base the exposure. In the first option all the tones lighter and darker than 18 percent grey will then be reproduced pretty accurately. In the second scenario – where you pick a tone to 'act' as 18 percent grey, but in reality it's actually brighter or darker – all the other tones will 'shift' accordingly thereby producing under- or overexposure respectively. You would pick this option if, for example, you want to expose for either the highlights or the shadows… which, of course, if you didn't apply some correction would result in, respectively again, underexposure or overexposure.

Even if you simply understand that the camera's meter is always averaging the contrast range in a scene to a mid-tone, then you'll appreciate why some under- or overexposure adjustment will usually be needed… either just so the image brightness looks right or it looks the way you want it to.

Of course, digital imaging allows for brightness to be adjusted after the picture has been taken, but there are still compelling reasons for getting the exposure right in-camera, including the dynamic range limitations of the camera's sensor.

## Working The Light

Once you know how the camera's light meter is working, you can then start to appreciate when you'll need to make corrections to get what you want in terms of the exposure. Another good example of this is a bright snow scene – all that reflected light will result in massive underexposure if you don't do anything about it and you'd end

▲This little button is more useful than you might think. The AE Lock (AEL) will hold an exposure reading while you recompose your picture. Use the spot metering mode to make a more selective exposure measurement off a tone that you want to set as the mid-tone so the highlights and shadows are reproduced as desired. The AE Lock means you can make this measurement from any desired point on the subject and then recompose. As show here some cameras allow for this button to be configured at either the AE Lock or the Autofocusing Lock (AFL) or perform both functions simultaneously.

with snow that's blue (in colour) or grey (in B&W).

To ensure that white snow is actually reproduced as white in your photograph, you'll need to give more exposure than the camera is recommending, perhaps as much as one or two stops more such is the high level of reflectance off ice crystals. As we've now seen, you can apply this overexposure in one of a number of ways – dial in some plus exposure compensation if using an auto control mode, switch to manual control and increase the exposure by using either a larger aperture or slower shutter speed (or a combination both) than is being recommended by the camera's meter, use auto exposure bracketing, or use the spot metering pattern and find something in the scene that's more representative of a mid-tone than snow (maybe a rock or the trunk of a tree) then use the AE (auto exposure) lock to hold this measurement while you recompose your picture. Other circumstances may dictate which method is the most effective or efficient, and when shooting snow (or sand) there needs to be a balance with the exposure settings to avoid ending up with overly bright highlights… but you get the idea.

> "What's important to know about a light meter of any sort is that the information it gives you is often only a starting point for determining exposure settings."

All the camera manufacturers provide a choice of metering methods – or patterns – in order to give you more options when dealing with specific subjects or lighting situations, or to use exposure more creatively.

- **Multi-zone** – also called multi-pattern metering or evaluative metering. The image area is divided into a pattern zones or segments (essentially groupings of pixels on the sensor) and the brightness level of each is measured separately. This information is then analysed using a database of scenes stored in the camera to determine which pattern fits best, and which zone(s) should be used as the basis for the exposure recommendations.

  Multi-zone metering works well with scenes that have a wide brightness or contrast range, but where there is roughly equal amounts of bright and dark tones. It is the best option for dealing with contrasty situation, but it will still ultimately arrive at an average reading, and large areas of brightness or shadow will still cause problems.

- Centre-Weighted Average – this type of metering was very common in 35mm SLR cameras from 1970s and '80s, and is still included on most mirrorless cameras and DSLRs. It averages all the light and dark areas in the frame, but then biases (or 'weights') this reading more towards the brightness level predominant at the centre of the frame. This can work well enough if your main subject is positioned here. However, if not –or the background is either very bright or quite dark – this type of metering will give an inaccurate reading that would result in either under- or overexposure respectively.

- Spot – as the name suggests, this method of metering concentrates all its attention (or 'weighting') on a very small area represented as a spot in the centre of the viewfinder frame. Typically spot meters only cover between two to five percent of the total frame area. However, they're quite useful if you understand the principles of exposure control, and prefer to meter off a selected tone to obtain bright highlights or deep shadows. Some cameras allow for the spot metering to be linked to the autofocusing point or zone so the exposure measurement will be based on the subject, rather than being influenced by any other part of the scene such as a bright background.

- Selective area metering – or partial area metering as it's also known – works along the same lines as spot measurements, but bases the exposure measurement on a slightly larger area which some photographers prefer.

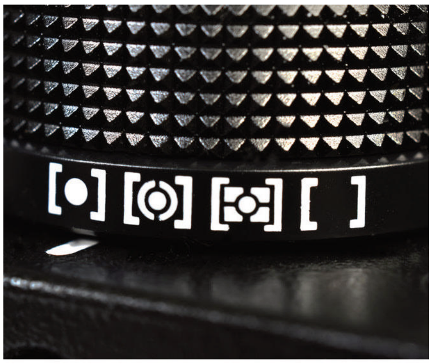
## Exposure Control Modes

Today all cameras offer a selection of exposure control modes which handle the exposure settings differently, but all obviously base these settings on the exposure value determined by the metering. The choice ranges from fully automatic to fully manual.

- **Program** (marked as P on a main mode dial or in the shooting menu) – the camera sets (and then adjusts) both the apertures and shutter speeds according to the available light level and the sensitivity or ISO setting. If you have set the ISO control to automatic, the sensitivity will also be adjusted by the camera if it 'runs out' of aperture or shutter speed settings… which will happen primarily in very low light situations.

- **Aperture-Priority Auto** (A) – you set the aperture manually and the camera sets the corresponding shutter speed automatically. You may also see this mode written as aperture-priority AE (for 'auto exposure'). Canon uses the term "Aperture Value" (Av for short). Again, if you have Auto ISO control activated, the sensitivity will also be adjusted by the camera as required.

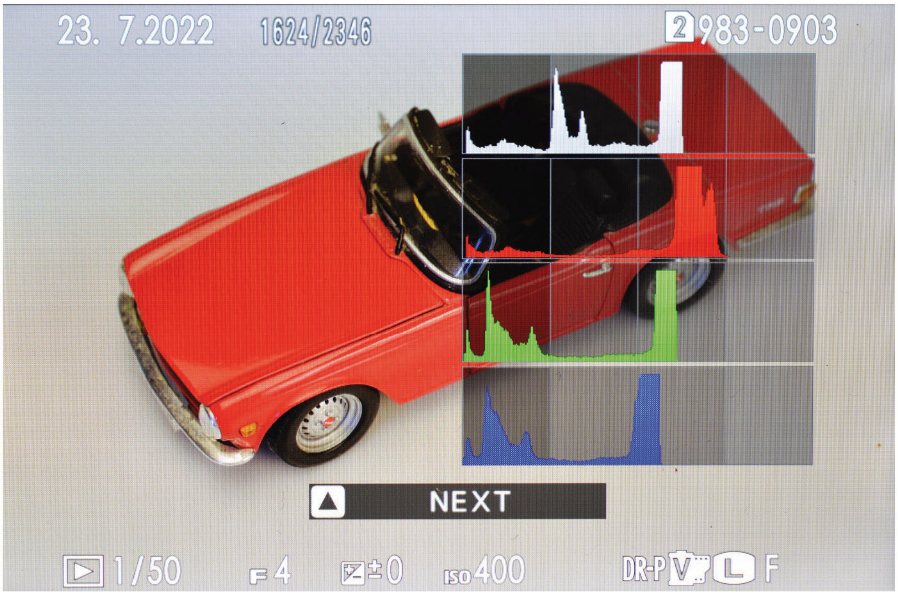
- **Shutter-Priority Auto** (S) – you set the shutter speed manually and the camera sets the corresponding aperture ▶



▲ Mirrorless cameras and DSLRs offer a choice of metering patterns or modes so you can tailor these measurements to better suit the lighting situation or the subject matter. Here the choices are spot metering, centre-weighted average, multi-zone and fully averaged.

automatically. You may see this mode written as shutter-priority AE (for 'auto exposure'). Canon uses the term 'Time Value' (Tv for short). Again, sensitivity will be automatically adjusted if needed when Auto ISO is switched on.

- **Manual** (M) – you set both the apertures and shutter speeds manually, guided by the camera's metering system.
- **Subject/Scene Programs** – quite a number of consumer-level cameras offer a selection of exposure modes tuned to suit specific types of subject such as portraits, sports action, close-ups, landscapes and night scenes. These are fully automatic, but the apertures and/or shutter speeds are selected to best match the key pictorial requirements of these subjects (i.e. faster shutter speeds for shooting sports action). These modes mostly work well, but are no real substitute for learning how to control exposure manually.



▲These histograms show the actual exposure used at capture with combined brightness values shown in the top graph and then the red, green and blue channels below. The latter will tell you if any one colour is skewing an exposure.

## Taking Control

So what exactly is an aperture and how does a camera's shutter work? If you're going to take charge of setting one or both manually, you need to know the role that both play in controlling exposure.

The aperture mechanism – also known as the diaphragm – is located inside a lens and comprises a set of blades which open or close. This allows more or less light to pass through to the image sensor, and their sizes (in other words, the diameter) are expressed in values called 'f-stops'. An f-stop is written as the letter 'f' followed by a number… i.e. f/4.0. These numbers are determined by a simple equation; the focal length of the lens divided by the diameter of the aperture. This results in a numbering sequence which is the opposite to what would seem logical… so the larger apertures have smaller f-numbers and the smaller apertures have larger f-numbers. In practice then, a lens might have an aperture range from, say, f/2.8 – its largest or widest aperture – to f/22 – which is its smallest aperture setting. As the diaphragm progressively closes down, each aperture setting – which represents one stop of adjustment – lets in half the amount of light as the previous one.

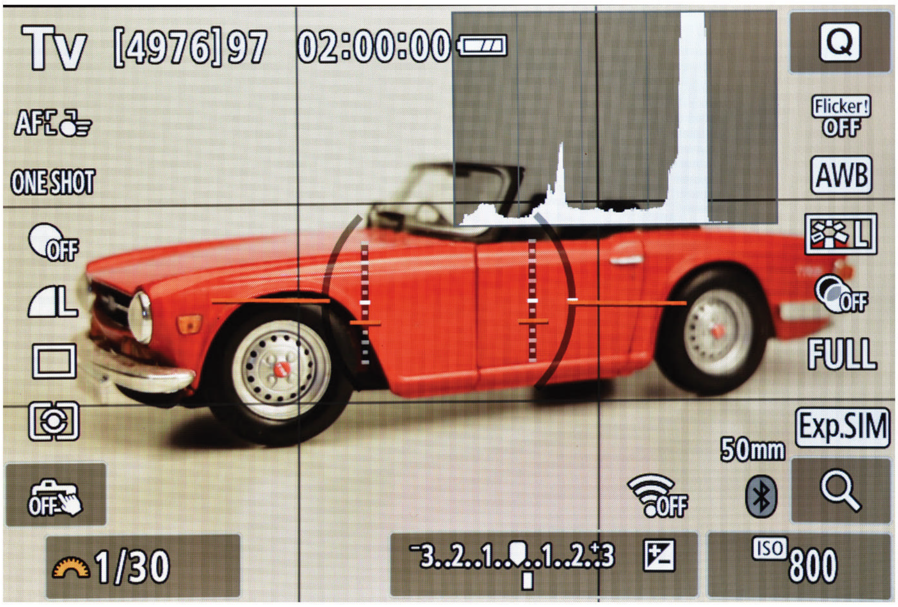
## Stops And Speeds

You can think of a 'stop' as the unit which applies to any exposure adjustment. Shutter speeds are also adjusted in stops, and the doubling or halving relationship between settings again applies.

While the aperture controls the amount of light coming through the lens, the shutter regulates how long the sensor is exposed to it… i.e. the *duration* of the exposure. This is done by opening the shutter for a period of time and then closing it. These timed settings are called the 'speeds' and they can vary from incredibly short durations – 1/8000 second, for example – up to several hours or even longer.

Short – or fast – shutter speeds are typically used in very bright conditions while slow shutters speeds – a.k.a. long exposures – are required when there's very little available light (i.e. at night). Fast shutter speeds are considered to be those from around 1/60 second up to 1/8000 second while slow speeds extend from 1/30 second to around 30 seconds or perhaps 60 seconds. This is generally the timed speed range available on a mirrorless camera or a DSLR, but there are provisions for making much longer exposures that you time yourself via 'B' (for bulb) or 'T' (for time) settings.

As with f-stops, the difference between each shutter speed setting – for example 1/30 second and 1/60 second – is one stop, but modern cameras offer intermediate settings representing one-third stop or half-stop adjustments such as 1/80 second (which is 1/60 second less one-third of a stop) or 1/400 second (which is 1/250 second less two-thirds of a stop). Remember that the faster shutter speeds progressively reduce the overall exposure with, for example, the 1/500 second setting halving the exposure from 1/250 second.



▲ A real-time histogram is shown in the live view image and depicts the light meter's measurements as a graphical representation of exposure. It can be a more reliable gauge of exposure than the live view image itself.

## Shutters

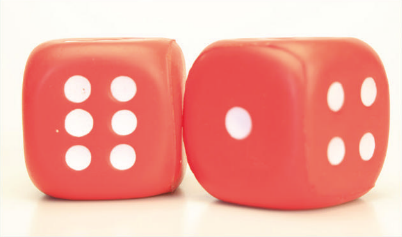
In film cameras the shutter was a physical mechanism which opened and closed using either cloth blinds (also known as curtains) or metal blades (which can also be called curtains). The most common type of physical shutter – particularly in SLR-type cameras – was a focal plane shutter, so-called because it's located in the camera body just in front of the image plane.

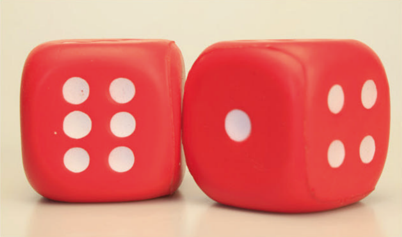
FP shutters continue to be used in most mirrorless cameras and all DSLRs, and these days all employ thin metal (or sometimes composite) blades which run vertically and open and close to control the exposure timings. With very fast settings, this opening will merely be a slit – of varying widths – that scans across the front of the sensor, but from about 1/60 second and slower, the shutter will open completely. The fastest speed at which the shutter is fully opened is also the maximum speed for using flash – and hence known as the *flash sync speed* – because otherwise part of the shutter would still be in front of the sensor when the flash is fired (so that part of the image will be significantly underexposed).

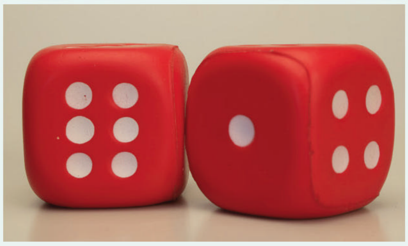
Some fixed-lens digital cameras – and also some of the lenses available for digital medium format camera systems – employ leaf-type shutters. These are also known as between-the-lens shutters or simply lens shutters because, you guessed it, they're located within a lens rather than in the camera body. Consequently, leaf shutters are circular in shape and work in much the same way as the aperture diaphragm, except they open fully and it's the time factor that controls the exposure. This design puts some limits on how fast they can be opened and closed, but flash sync is available at any and all speeds (which is attractive to some professionals such as wedding photographers).

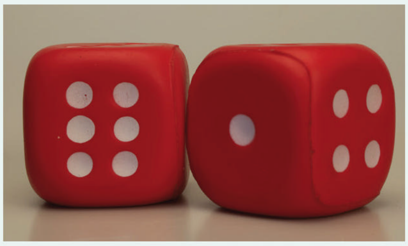
> “Some metering modes are cleverer than others, but the output is still the same... a value that represents a mid-tone equal to an 18 percent grey tone.”

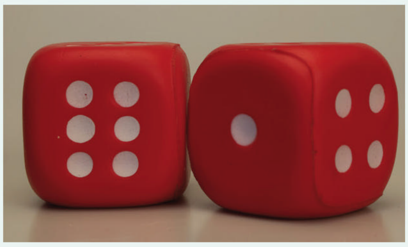
## AE Bracketing


+2.0

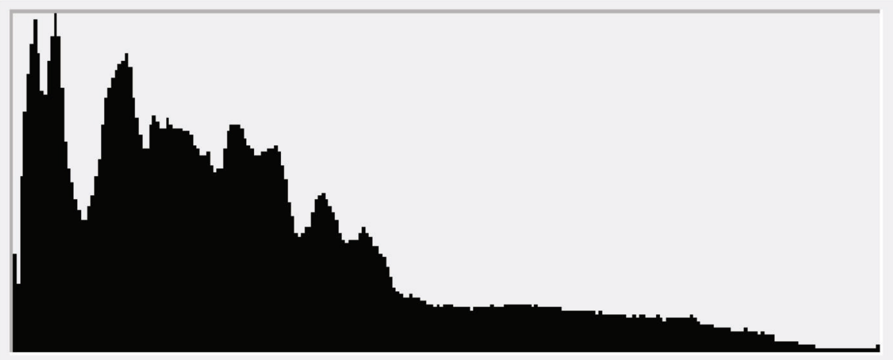

+1.0


metered exposure


-1.0


-2.0

Auto exposure bracketing automatically captures a sequence of images, adjusting the exposure for each frame either up or down around the metered exposure setting. You set the amount of plus/minus exposure variation which, typically, can be up to three stops either way. Shown here is five-frame sequence captured with a plus/minus one stop adjustment – +2 stops overexposed, +1 stop overexposed, normal, -1 stop underexposed and -2 stops underexposed. In practice, you probably wouldn't apply such a big variation between shots, as it's the small differences that tend to make the all the difference.



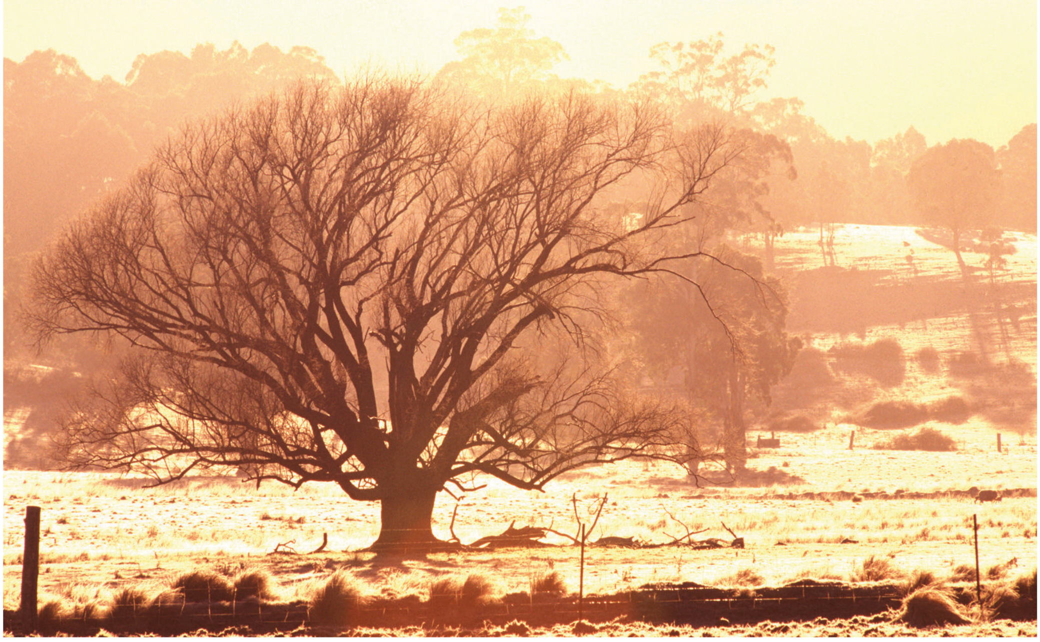
## Reading The Exposure Histogram

It can be very difficult to gauge exposures in a digital camera's monitor screen or electronic viewfinder, and a much more reliable guide is provided by the histogram display. There's the option of a real-time histogram display in the live view screen, but arguably more useful is the display provided in image review after capture. You can read the histogram to see the amount of exposure from the shadows through the mid-tones to the highlights.

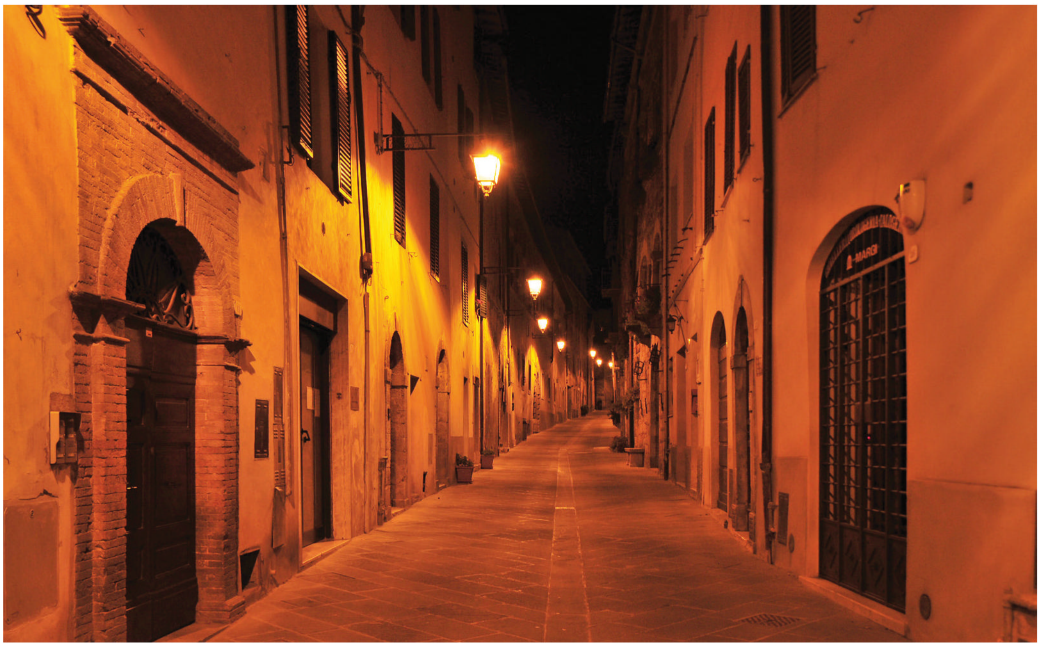
The histogram is a graphical representation of image brightness levels from black (i.e. the darkest pixels) at the left through to white (the brightest pixels) on the right. This corresponds to brightness values of 0 (black) to 255 (white). This scale is derived from the binary code that represents the building blocks of a digital image, and relates to bit depth. In other words, how many bits – pieces of computer data – are used to represent each pixel in an image.

Digital cameras output images at 8-bits per RGB channel (although they may process the data internally at a higher bit depth). So, 2 to the power of 8 = 2x2x2x2x2x2x2x2 = 256 levels or, in digital terms, 0 to 255 brightness levels. The histogram shows the number of pixels recorded at each brightness level across this range.

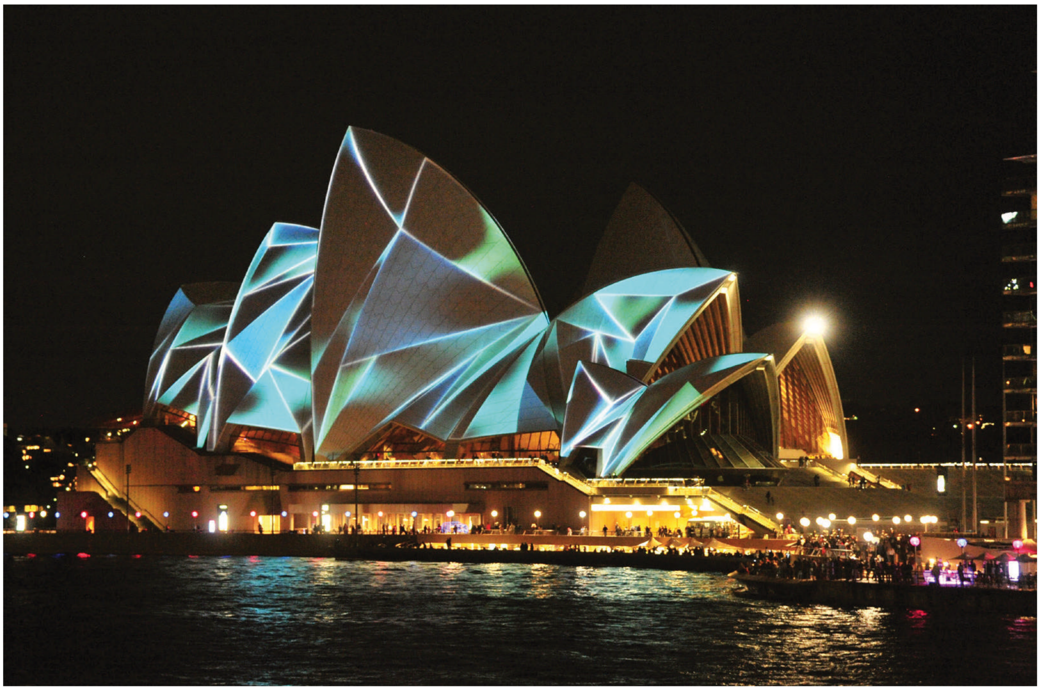
So a histogram showing a lot of 'spikes' to the left side has a predominance of darker pixels and so represents an underexposed image. Conversely, a histogram with a lot of spikes towards the right has a predominance of brighter pixels and so represents an overexposed image. It's been said that you should aim for the shape of a mountain in your histogram – i.e. the spikes are predominantly in the middle – as this represents a 'correct' exposure. This is technically true, but doesn't take into account the possibility that you may want an image that is either underexposed or overexposed. Consequently, use the histogram as a starting point for making corrections or achieving creative outcomes.



◀ A high-key image contains predominantly lighter tones. The camera's metering will want to be bring the exposure back to a mid-tone so you'll need to overexpose to maintain the overall brightness.



◀ Night photography presents many challenges and different situations may require you to either under- or overexpose depending on the mood that you want to create. However, this street in a small Italian village was very well lit so the camera metered it pretty



◀ It might seem counter-intuitive to underexpose a night scene, but the metering will err towards overexposure – even with plenty of light sources in the shot – so here -2/3 EV of exposure compensation has been applied to ensure that the sky and water are rendered as black.

In a digital camera, exposure times can, alternatively, be controlled by using the sensor to scan the subject. The advantages of the sensor-based shutter are that it is completely silent and eliminates any vibrations. However, there can be some issues when shooting fast-moving subjects, notably rolling shutter distortion which is caused because the subject is effectively being exposed line-by-line and the tiny time lag across the frame results in a bending effect. Also depending on the sensor's read-out rate, it's generally not possible to use electronic flash. However, both issues are being addressed with technological developments namely stacked sensor designs and, most recently, the global shutter sensor. Stacked sensors incorporate an ultra-fast DRAM memory to significantly speed up the line-by-line read-out thereby minimising rolling distortion, allowing for flash sync at a faster shutter speed, and also enabling a black-out free viewfinder… however, it is still scanning the subject to make an exposure.

In comparison, a global shutter sensor exposes using all its pixels simultaneously so it's actually better than a physical shutter which is also progressive in its operation. We're still using the word "shutter", of course, but it's actually not a shutter in the traditional sense as there's no lag and no time delay between the start and finish of an exposure. So far, Sony's A9 III is the only consumer camera available with a global shutter sensor which allows for a continuous shooting speed of up to 120 fps with no distortion or viewfinder black-out, and flash sync is possible at any shutter speed up to 1/80,000 second. The downside is that both image noise and dynamic range appear to be slightly compromised.

Because there are no moving parts, sensor shutters can operate at much higher shutter speeds than a physical shutter which has to move actual blades. For the same reason, they also allow for much faster shooting speeds. The extra speed of a stacked shutter means that a number of higher-end mirrorless cameras are now arriving which don't have a physical shutter at all (such as Nikon's Z 9 and Z 8).

As an aside, the naming adopted for these different types of shutter can be confusing. Sensor shutters are often referred to as "electronic shutters" which was the terminology traditionally used to describe a physical shutter that is electronically-controlled… which they all are in today's mirrorless cameras or DSLR. Equally confusingly, the physical shutter is now called a "mechanical shutter" which was the term used describe a physical shutter that was mechanically-controlled… as many classic 35mm SLRs and RF cameras.

> “Here's the most important point to make about exposure control… it's rarely about being technically correct.”

As both stacked sensors and global shutter sensors are very expensive devices they're likely to be limited to the top-end mirrorless cameras, and many models will remain using the combination of a focal plane shutter and a sensor shutter, as is the case now. Here there is a third option which the combining of both shutters to make an exposure… the sensor is still used to scan the subject, the exposure is completed using the focal plane shutter's second set of blades. It's called the "electronic first curtain shutter" (EFCS) and the main advantage is that it permits the use of electronic flash while also reducing noise and vibrations compared to the full FP shutter operation. This can be advantageous when shooting at slower shutter speeds or with longer focal length (i.e. higher magnification) lenses. The compromise is that the fastest EFCS speed is usually slower than the FP shutter and a lot slower than when using the sensor shutter alone.

## Exposure Values

Now you know that apertures and shutter speeds both control exposures, then obviously they can be worked together in combination which is important because both adjustments also have visual implications.

Aperture settings affect the depth-of-field – the zones in front of and behind the focusing point that are still sharp – and the shutter speed will affect how movement is recorded in a photograph. Put simply, a fast shutter speed 'freezes' movement while a slower speed will create varying degrees of blurring (simply because the subject moves while the shutter is open). There are obviously creative implications here, so the combination of aperture and shutter speed that you select does more than simply control the exposure. It's for this reason that being in control of these settings – rather than simply leaving it to the camera – enables you to achieve the visual outcomes that you want or, indeed, which are better matched to the subject or scene.

This is where understanding *exposure values* comes in handy. At any given light level – as measured by the camera's exposure meter – the combination of aperture and shutter speed which gives a 'correct' exposure is collectively called the exposure value (or EV for short). But remember that apertures and speeds work together so, if you reduce one by a stop, but then increase the other by a stop, the EV remains exactly the same (i.e. you've halved one and doubled the other). You can do this across the full ranges of apertures and speeds available on your camera so the following combinations actually all deliver exactly the same exposure value.

- 1/4000 second at f/2.0
- 1/2000 second at f/2.8
- 1/1000 second at f/4.0
- 1/500 second at f/5.6
- 1/250 second at f/8.0
- 1/125 second at f/11
- 1/60 second at f/16
- 1/30 second at f/22
- 1/15 second at f/32
- 1/8 second at f/45

You'll again note that the relationship within any exposure value is simple; if you reduce one by a stop, you have to increase the other by a stop in order to maintain the same amount of exposure. So, for example, if you're shooting high-speed sports action, you might use 1/2000 second at f2.8, but if you're shooting close-ups and need maximum depth-of-field, you might use f32 at 1/15 second.

At any given light level, then, there is always a choice of aperture and shutter speed combinations that you can use to obtain the required exposure, and your selection may often be dictated by the nature of the subject itself.

## Sensitivity

There is a third key adjustment which is related to exposure and that's the sensitivity setting which is expressed in ISO values (primarily to it can be related back to the old film speeds). An imaging sensor's sensitivity is determined primarily by the size of the pixels, but also the design of the microlenses which help concentrate the light rays over each photodiode.

Like a film's speed it is a fixed value – say ISO 200, for example – but digital cameras also allow for higher sensitivities to be set. This is achieved via electronically amplifying the signal from the sensor, but this process also amplifies the interference component which creates 'noise'. The continued refinement of noise reduction processing is delivering ever better high ISO performance from digital cameras, but there are still some image quality issues caused by the processing's 'side effects' (often called artefacts) which essentially limit the reproduction size when making prints. One option is to shoot RAW files – which aren't corrected in-camera like JPEGs – and then perform the noise reduction processing later using image-editing software.

Like apertures and shutter speeds, ISO settings are adjusted in stops with, again, the values either doubling or halving with a one-stop adjustment. So, for example, ISO 400 is twice as sensitive as ISO 200, and ISO 100 is half as sensitive as ISO 200. However, again many cameras allow for

◀ The sun positioned just outside this frame is creating a lot of brightness which results in the metering underexposing… which is fine if you want the darker subjects to be silhouetted. These are situations where exposure bracketing can help you find the best balance of highlights and shadows.

◀ Snow is highly reflective so these scenes can be very bright overall and the metering will underexpose as a result because it's setting a mid-tone grey which, in colour, will give you blue snow. If you want white snow, it will be necessary to deliberately overexpose.

these adjustments to be made in either one-third stop or half stop increments for finer control.

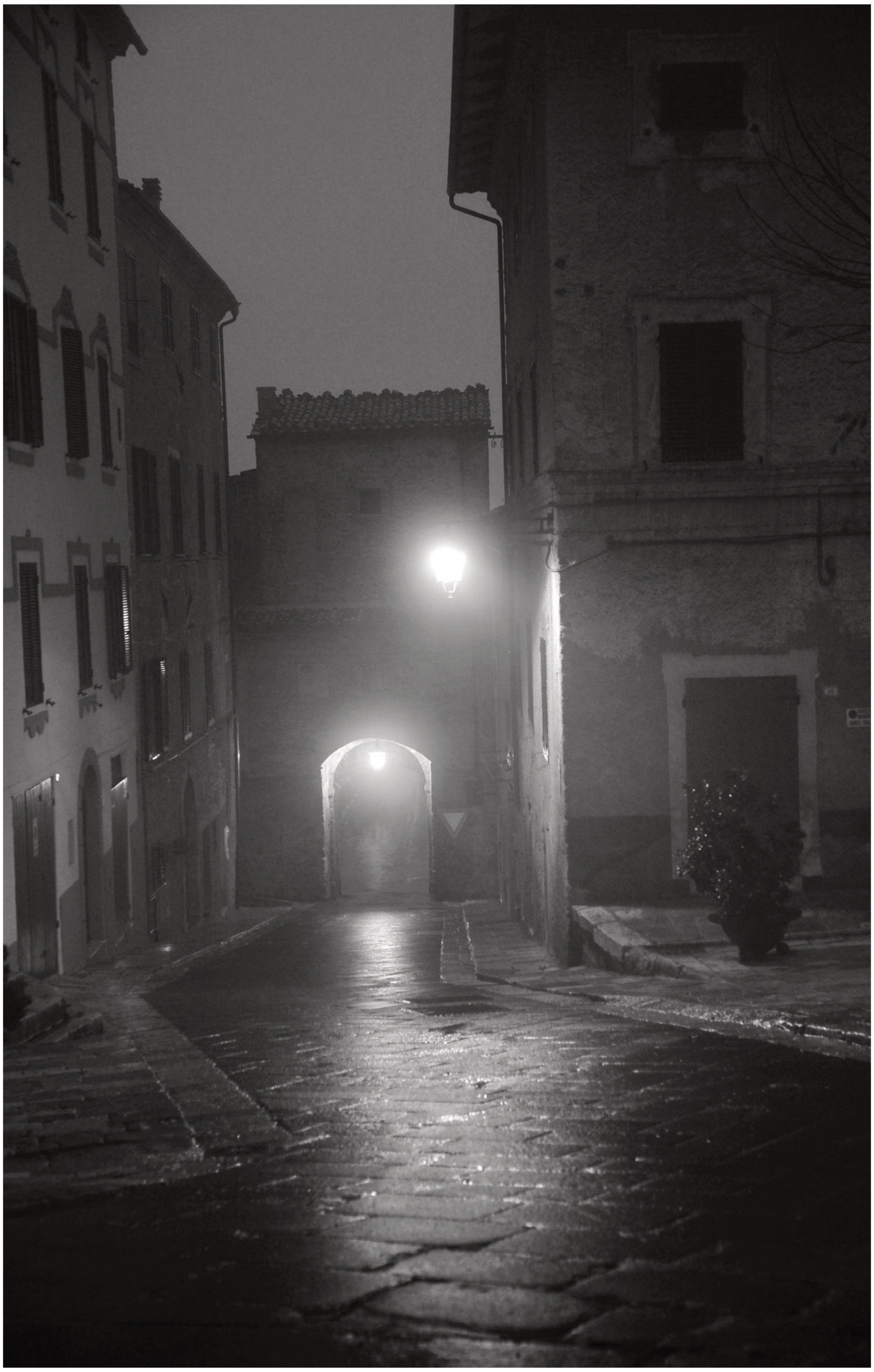
You might select a higher ISO setting – perhaps 800 or 1600 – when shooting sports action because it will then allow you to use faster shutter speeds with smaller apertures than a slower ISO setting (at a given exposure value). However, as just noted, the low sensitivity settings will deliver optimum sharpness and detailing, but in low-light situations, you will then need to use very slow shutter speeds and/or larger apertures to obtain the correct exposure (and, consequently, may have to put the camera on a tripod).

The good news is that high-ISO performance – even with smaller-sized sensors (remember that sensitivity is related to pixel size) – is now good enough to allow shooting at ISOs settings that were never available with film. If you're only making smallish prints (i.e. no bigger than A4) or posting the images online, there's even more scope for shooting at very high ISO settings such as 12,800, 25,600 or even 51,200. Some stratospheric high ISO settings are now available on higher-end D-SLRs and mirrorless cameras, but the reality remains that noise is still an issue so their 'real world' applications are limited.

What happens if you change, say, the aperture, but then don't adjust the shutter speed to compensate? If you've selected a smaller aperture, then the image will be underexposed. If you've selected a larger aperture, the image will be overexposed. The same outcomes will happen if you set either a slower shutter speed without adjusting the aperture to compensate. However, this isn't always a bad thing because you may, in fact, deliberately want to either under- or overexpose an image, either for technical reasons or for creative effect. An image where highlights – or lighter tones – predominate is described as being *high-key*, while one where the shadows – or darker tones – are dominant is called *low-key*.

Again, only by manually setting the apertures and shutter speeds do you have this level of control, although there are alternative options which will be covered in the next article.

With experience, you'll learn to recognise



◀ Strong backlighting will fool the metering into underexposing, but multi-zone metering measurements – in particular – will still try to be more even-handed so here -1.0 EV of exposure compensation has been applied to create more of an atmosphere.

when a lighting situation or the type of scene demands some intervention on your behalf to achieve either a correct exposure or a desired creative outcome.

## Creative Exposure Control

Determining exposure settings – apertures, shutter speeds and sensitivity – is not solely dictated by how much light is available, but also by the type of subject that you are photographing as there are visual effects that are directly linked to either the aperture or the shutter speed settings There are a number of ways that you can either control exposures totally manually or override the automatic controls to better suit particular subjects or situations.

Let's look at the auto override functions first because these can be very useful in quickly adjusting exposures to obtain a desired creative outcome. You can use any of these if the camera is being used in any of its automatic exposure control modes (i.e. program auto, aperture-priority auto or shutter-priority auto). The exposure compensation facility allow you to dial in a certain amount of under- or overexposure – over a range of up to plus or minus five stops, depending on the camera – and in either half-stop or one-third stop steps. You'll see this feature written in a camera's specifications as, for example, +/-5.0 EV (the 'EV' obviously standing for 'exposure value'). Many photographers use a small amount of under- or overexposure as a matter of course because, with experience, they've found that their images look better this way. Often with digital capture, it a good idea to apply a small amount of underexposure (for example, two-thirds of a stop) in order to better preserve detail in the brighter highlights.

If in doubt about the exposure settings to use, you can select the auto exposure bracketing (AEB) function. Bracketing is the term given to the procedure of taking a number of frames of the same subject, slightly adjusting the exposure each time, usually from under to over. You can do this manually, of course, but auto bracketing saves time by automatically capturing a sequence of three or more frames, applying whatever under/over adjustment you've selected and set. The bracketing range available varies according to the camera model, but is generally around plus/minus three stops per frame. AEB sequences can be up to nine frames on some cameras, but in reality you're unlikely to need to go beyond either three or five frames to obtain one with the desired exposure.

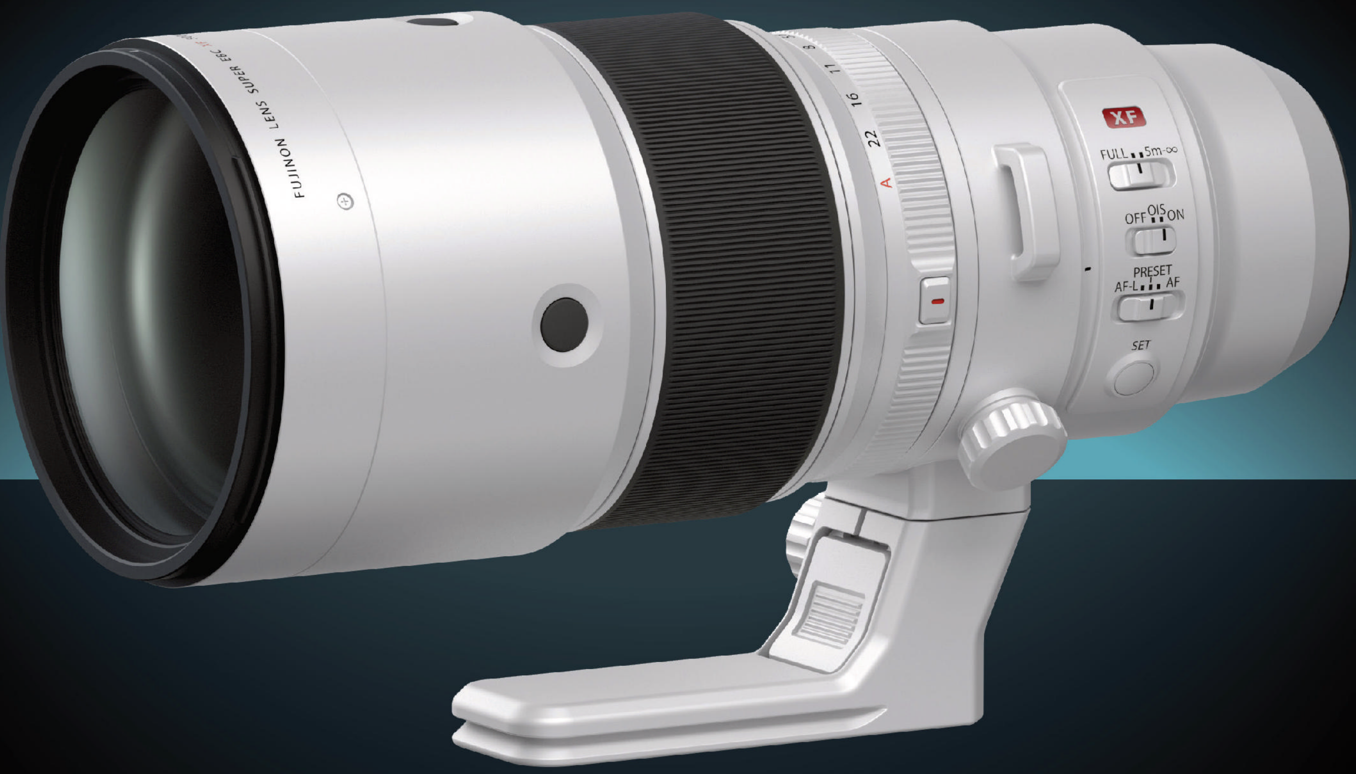
Bracketing exposures is good insurance, but obviously it increases the amount of memory space being used up with each shot by a factor of three or more. With experience, you should be able to tell what exposure correction is required so you can then adjust the bracketing settings accordingly and avoid capturing unnecessary frames.

Another useful override is the auto exposure lock – or AE lock – which, just as the name suggests, locks in a light reading (and the applied exposure settings) so it won't change if you subsequently move the camera to reframe a scene. The AE lock is especially handy when using either spot or selective area metering patterns – more about these in a moment – to measure a small area of the scene which represents the tone (i.e. the brightness level) on which you want to base the exposure. Pressing the AE lock button holds the exposure settings while you recompose your shot… otherwise, the metering would simply keep changing depending on which bit of the scene it was measuring.

*In the next installment of Back To Basics we'll delve deeper into how apertures and shutter speeds also influence pictorial elements in a photograph. Apertures are one of the factors determining depth-of-field while shutter speeds have an effect on the freezing or blurring of moving subjects. More to think about when you're taking over*

REPORT BY **PAUL BURROWS**

# FUJINON
## XF 500mm f/5.6 R LM OIS WR



▲Yep, you've seen it before... X mount 500mm f/5.6 supertelephoto is derived from the G mount model for Fujifilm's digital medium format system

# GOING THE DISTANCE

**X mount shooters now have a handy supertelephoto prime which, while effectively delivering 760mm, is still surprisingly easy to use hand-held.**

Telephoto primes – and supertelephotos too – are staples of any lens system, but they seem to have been a bit low on the lists of priorities for mirrorless cameras. Telezooms have been a more popular route to longer focal lengths, especially with the cropped sensor systems probably because it's easier to go even longer with a smaller and lighter lens. Until now, the longest prime in Fujifilm's X mount line-up has been the very yummy but pricey Fujinon XF 200mm f/2.0 R LM OIS WR – effectively 305mm at the same super-fast f/2.0 maximum aperture – but there's the XF 150-600mm f/5.6-8.0 R LM OIS WR zoom which gives you 229-914mm… and, at around $3500, it's not especially expensive either. However, telezooms have their pluses and minuses which is why many sports and wildlife photographers, in particular, prefer prime supertelephotos.

Finally, Fujifilm is giving X mount shooters the option in the shape of the XF 500mm f/5.6 R LM OIS WR which delivers an effective 762mm. It uses the same optical design as the medium format G mount GF 500mm f/5.6 R LM OIS WR (which is effectively 396mm), but has the silvery-white finish that Fujifilm reserves for its long telephoto X mount lenses (primarily to increase reflection and so reduce excessive heat building up inside which can be problematic with such a long barrel). Consequently, the XF model's external dimensions are very similar too, although in any format, this isn't a particularly big or heavy lens… which is especially the case when you're getting 762mm. For the record, it's 270 grams lighter than the XF 150-600mm zoom and nearly 60 millimetres shorter plus, at 500mm, it's a stop faster, but it has to be noted, you're paying close to $2000 more for all this… although there's the optical performance to consider here too (more about this soon).

The XF 500mm f/5.6 comes with a substantial lens hood – smartly emblazoned "Fujinon" – its own drawstring pouch and a shoulder strap which attaches to a pair of lugs on the lens barrel itself. There's a rotatable tripod mounting collar which can't be removed, but the foot section can be detached if you're sure you won't be needing a tripod (or a monopod for that matter). As has now become quite common, the plate itself is an Arca-Swiss railed fitting.

## OPTICAL DESIGN

At work inside the XF 500mm f/5.6 are 24 elements in 14 groups and seven of these are special types – namely five with extra-low dispersion (ED) characteristics and two that are classified as 'Super ED' extra-low dispersion types so they're even more effective at minimising chromatic aberrations. Of course, these ED elements also contribute to overall sharpness and contrast.

The Fujifilm X mount bodies automatically correct in-camera for distortion, vignetting and also chromatic aberrations. Additionally, there's a 'Lens Modulation Optimiser' (LMO) function which corrects for diffraction and actually reconstructs some of the lost edge data. LMO additionally corrects for any sharpness fall-off in the corners of the frame, but it is the only manually-selectable in-camera lens correction (and even then it can only be switched on or off). With RAW capture, and depending on which converter you use, Fujifilm's lens correction profiles are applied automatically (such as in Lightroom) or available to be applied manually.

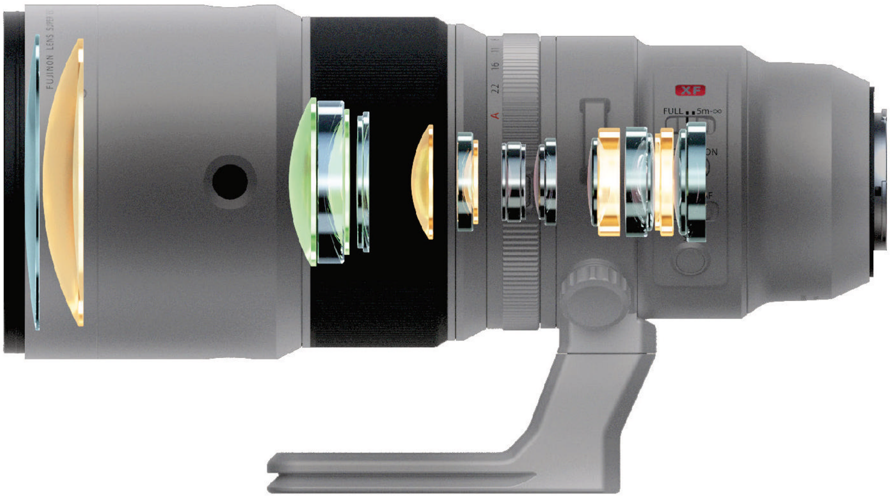
Focusing is performed internally – so the lens doesn't increase in length – and the AF drive employs a linear stepping motor for better responsiveness and increased speed. Fujifilm claims it can be as quick as 0.33 seconds, but you'll need your X mount body to be in the power-hungry 'High Performance' mode. The minimum focusing distance is 2.75 metres which gives a magnification ratio of 1:5 – that's 1/5th life size – so subjects such as small birds or insects are going to stay small in the frame.

TELEZOOMS HAVE THEIR PLUSSES AND MINUSES WHICH IS WHY MANY SPORTS AND WILDLIFE PHOTOGRAPHERS, IN PARTICULAR, PREFER PRIME SUPERTELEPHOTOS."

If 762mm isn't long enough, the X mount 500mm is compatible with the two XF series teleconverters with the 1.4x giving 1067mm and f/8.0 (effective focal length) and the 2.0x producing 1524mm at f/11.0.

The optical image stabiliser is good for up to 5.5 stops of correction for camera shake over yaw and pitch movements on its own, but when combined with an IBIS-equipped X-T or X-H series body, there's full five-axis operation. It's not clear whether this also gives an extended correction range, but given the magnification power of the 500mm at 762mm, it's unlikely.

The external construction uses a combination of magnesium alloy and polycarbonate components and is weather sealed – there's 20 in all including a gasket around the lens mount – plus it's protected to enable shooting in subzero temperatures down to -10 degree Celsius. Additionally, the exposed surface of the front element has been given a hydrophobic fluorine coating to help repel moisture and grease, as well as making it easier to clean. The screwthread filter fitting is a whopping 95 millimetres in diameter and there isn't a holder at the rear so buying a circular polariser, for example, won't be a cheap exercise. A plus point, however, is that the hood has sliding hatch at its rear for directly accessing filters that are variable in effect.



▲ Optical construction has been designed to enhance the lens's handling balance by ensuring there isn't too much weight towards the front.

## IN THE HAND

The biggest surprise – initially at least – is just how light and manageable the XF 500mm feels, especially when it looks like it might be quite a heavy lens. The barrel construction obviously has something to do with it, but there's still a lot of glass in there, but Fujifilm has worked on the overall balance so this is probably a contributing factor. Weighing it at a shade over 1.3 kilograms, it's obviously not really a lightweight lens – and you're looking at very close to two kilos in the hand with the likes of the X-H2

▲ Manual aperture collar has one-third stop adjustments.

▲ Tripod mounting plate is detachable if you want to save a bit of weight when hooting hand-held. Coupling is Arca-Swiss.

▲ Weather protection measures include a substantial rubber gasket around the lens mount to prevent the intrusion of dust or moisture.

▲Massive front element – the filter fitting is 95 millimetres – has a fluorine coating to help repel moisture and grease while also allowing for easier cleaning. Fit a UV protection filter immediately is our advice.

attached to it – but it does handle very comfortably and you can shoot for quite a while without feeling any strain.

There are a number of controls on the barrel with the main panel comprising a focus limiter switch, an on/off switch for the optical stabilisation, a three-position selector for the AF functionality and a button that's marked 'Set' button. These last two controls relate to the four buttons – located at 90-degree intervals – around the front of the lens. These can serve as conventional focus hold buttons or can be assigned a particular focusing distance when the three-way selector is set to 'Preset'. Pressing the 'Set' button then locks in the desired distance which can be instantly recalled via any of the four function buttons. However, once they're assigned, they will all do the same thing. The third function is as an 'AF On' button.

The focus limiter only has two settings for either the full range or for a small reduction covering five metres to infinity which will, nonetheless, save time if you don't need to get any closer.

THE IMAGE CIRCLE IS FOR THE BIGGER "33X44" SENSOR SIZE SO THE 'APS-C' IMAGING AREA IS RIGHT IN THE SWEET SPOT AS FAR AS UNIFORMITY OF SHARPNESS AND BRIGHTNESS ARE CONCERNED."

As with all the XF lenses, there's a manual aperture collar which delivers one-third stop adjustments from f/5.6 to f/22 and locks on its 'A' setting for auto aperture control. There's no de-click option for seamless exposure adjustment when shooting video.

The manual focusing collar is, not surprisingly, electronic 'fly-by-wire' so there's no end detents and you have to watch in the viewfinder to see exactly what's going on (which is where the focus peaking display proves particularly useful). However, it's nicely weighted and allows for precise, linear control.

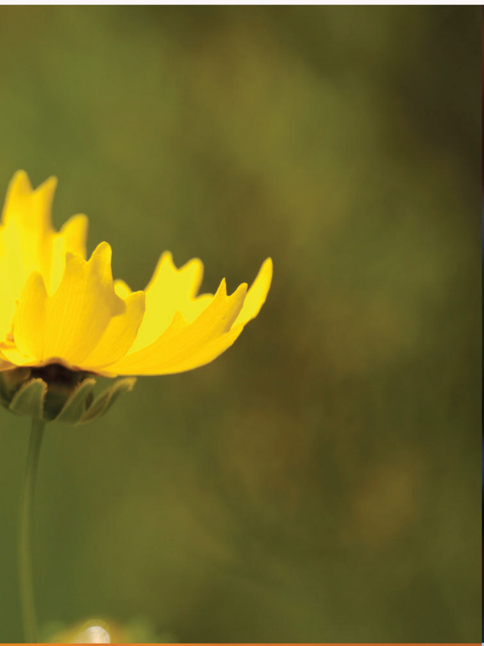
## PERFORMANCE

We tested the Fujinon XF 500mm f/5.6 on an X-T5 body which made for a slightly lighter weight package than the X-H2 that the test lens was supplied with, but still has the 40 megapixels 'X-Trans CMOS 5 HR' sensor.

The autofocusing is both responsive and fast enough to keep up with the AI-based subject recognition and speedy tracking in the X-T5 which can be at up to 20 fps. However, the non-AI subject acquisition was a little slower and subsequently less 'sticky' with very erratic movements. The AF operation is also quiet and certainly won't be heard by even a sharp-eared wildlife subject.

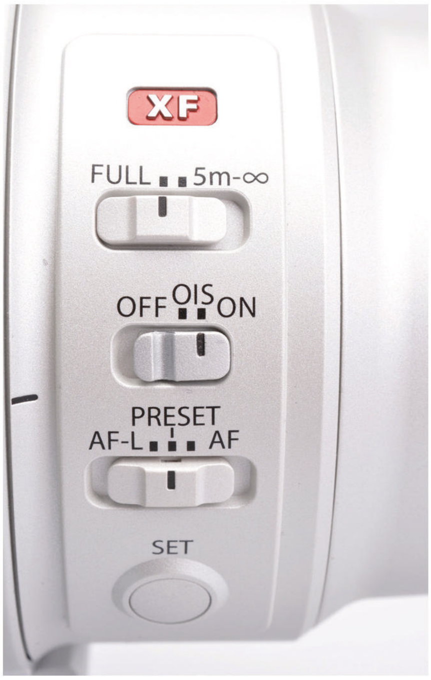
Longer focal lengths mean inherently less depth-of-field – although not quite as

▶ Test images captured as JPEG/large/fine files with a Fujifilm X-T5 using shutter-priority auto exposure control and the Vivid/Velvia 'Film Simulation' preset. The sharpness across the frame is exceptional event at f/5.6 with negligible distortion or longitudinal chromatic aberration. There's no vignetting either. The transition from in-focus to out-of-focus is linearly smooth, giving pleasingly soft backgrounds.



much here as with a full frame or medium format sensor – so precise focusing is important both in terms of what will be sharp and what won't be. Mind you, there's still some depth-of-field to play with at f/5.6 and obviously even more if you stop down. In practice though, the smaller Single-Point AF areas available with the Fujifilm X mirrorless bodies – there's a choice of six sizes – work particularly well with this lens, especially as they're easy to quickly position as desired with the joystick controller. The nine-blade diaphragm gives soft and smooth out-of-focus effects, while the transition from the sharp to the blurred is nicely progressive. Shooting at the closest focusing distances renders backgrounds virtually completely soft so they're just tones and vague, indistinct shapes.

Being originally designed for the 102 megapixels sensors in the GFX100 series medium format cameras, the optics have no problem resolving every bit of detail that the 40 MP 'X-Trans CMOS 5 HR' sensor can deliver. Additionally, the image circle is for the bigger "33x44" sensor size so the 'APS-C' imaging area is right in the sweet spot as far as uniformity of sharpness and brightness are concerned. Consequently, at f/5.6 – which is "wide open" for this lens – the corners are as sharp as the centre of the frame – which is very sharp indeed – and stopping down doesn't seem to make any discernible difference. There's no vignetting either and negligible distortion. Longitudinal (or axial) chromatic aberration is extremely well controlled even at the edges of the frame, and this is the case across the aperture range.



▲ On-barrel control panel includes a focus limiter switch and set-up for focus operations.

▲ There's a total of four customisable function buttons located around the front of the lens. Default is focus hold, but a focus distance can be preset for instant recall.

Shooting over such long distances can mean issues with atmospheric haze diminishing contrast which is another reason why investing in a UV filter is a good idea. However, the XF 500mm's optics are pretty contrasty to start with. The vast expanse of front element would suggest that flare is potentially also likely to compromise contrast, but even without the substantial hood fitted, it doesn't appear to be a problem and you can actually shoot straight into the sun without ghosting.

While a maximum aperture of f/5.6 allows for a more compact (and less expensive) supertelephoto lens, it also means that you have less light to play with right from the start. Also conspiring against you is that the '1/focal length' rule that determines the minimum safe shutter speed for hand-held shooting is based on the effective focal length with a cropped sensor… so, in this case, 1/760 second. Of course, the image stabilisation gives you some scope to shoot at slower speed as does the this lens's well-balanced and comfortable handling… plus the imaging performance at f/5.6 is truly excellent so you don't necessarily need to stop down to get anything more. It's definitely a case of swings and roundabouts, but the XF 500mm can realistically be hand-held without too many compromises, and this is obviously more desirable in terms of unrestricted manoeuvrability so that you can respond quickly to whatever is going on.

## THE VERDICT

A lens built specifically for the 'APS-C' sensor size would likely have been both smaller and lighter again, but then the XF 500mm's medium format optics deliver significant improvements to image quality which is probably the main reason Fujifilm opted to go down this path. And it's still very manageable with hand-held shooting less of a chore than might be expected… even over reasonably long periods of time.

> THE BIGGEST SURPRISE – INITIALLY AT LEAST – IS JUST HOW LIGHT AND MANAGEABLE THE XF 500MM FEELS, ESPECIALLY WHEN IT LOOKS LIKE IT MIGHT BE QUITE A HEAVY LENS."

With a focal length equivalent to 762mm, this is obviously a specialised lens, but it gives X mount shooters something that they've haven't had before… namely, a native prime supertelephoto that's neither overly bulky nor excessively expensive. The superlative optical performance is its biggest selling point with the rest of the functionality and specs ticking plenty of boxes for sports, adventure and wildlife photographers. To be honest, they've mostly been better catered for by other mirrorless systems, but the XF 500mm f/5.6 R LM OIS WR has the potential to change all that… especially in the context of the full suite of Fujinon XF offerings.

## VITAL STATISTICS

### FUJINON XF 500mm f/5.6 R LM OIS WR

### $5399

Format: 'APS-C' digital sensors. Effective focal length is equivalent to 762mm.
Angle-of-View: 3.3 degrees (diagonal on 'APS-C').
Construction: 24 elements/14 groups. Seven special elements – five extra-low dispersion (ED) types and two 'Super ED' extra-low dispersion types.
Minimum Focus: 275 centimetres.
Maximum Reproduction Ratio: 1:5.
Aperture Range: f/5.6 to f/22.
Overall Length: 255 millimetres.
Maximum Diameter: 105 millimetres.
Filter Diameter: 95 millimetres.
Weight: 1335 grams (without lens hood or tripod foot).
Lens Mount: Fujifilm X.
Features: Weather-sealed external construction including insulation for operation in subzero temperatures down to -10 degrees Celsius, fluorine coating on front element, optical image stabilisation (up to 5.5 stops of correction for camera shake), internal focusing, high-speed linear AF motor, 'Focus Preset' button, four 'Focus Control' buttons (for AF-on, focus hold or recall focus distance preset), focus range selector/limiter (full range or 5.0 metres to infinity), built-in tripod collar with detachable foot (Arca-Swiss plate), 'Super Electron Beam Coating' (EBC) anti-reflection multi-coating, nine-blade diaphragm. Bayonet-fit lens hood supplied. Supports the Fujinon Teleconverter XF 1.4X TC WR and Teleconverter XF 2.0X TC WR teleconverters
Price: $5399. Fujifilm Australia provides a three-year warranty for X series mirrorless cameras and lenses purchased in Australia from an authorised reseller. For more information visit www.fujifilm.com.au
Distributor: Fujifilm Australia, telephone 1800 226 355 or visit www.fujifilm.com.au

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# THE MIRACLE (AND SCIENCE) OF MIRROR LENSES

This could get confusing… a mirror lens on a mirrorless camera? What is a mirror lens exactly? More importantly, why can they be very handy for long telephoto photography?

Report by **Paul Burrows.**

FUJIFILM
X-T5
Tokina

▲Tokina's SZX Super Tele 400mm f/4.0 Reflex MF attached to the Fujifilm X-T5 on which it's effectively a 600mm supertelephoto. Tokina's mirror lenses are available in a variety of full frame and cropped frame mounts.

The technical definition of a telephoto lens is one with a focal length greater (or longer) than 50mm (on the 35mm/full frame forma), but the telephoto range is more generally accepted to begin at around 85mm which would be classified as a 'short telephoto' lens. Beyond 300mm you move into the 'supertelephoto' range which includes 400mm, 500mm and 600mm lenses. Anything longer than 600mm is generally for specialised applications such as wildlife or some sports.

The focal length of a lens is actually the distance from its optical centre – also called the rear nodal point – to the focusing point in the camera which, obviously, coincides with the focal plane in the camera (also called the plane of sharp focus). Due to the longer focal length, telephoto lenses are inherently bigger and heavier which makes them more challenging to use hand-held. A faster telephoto – i.e. one with a larger maximum aperture – is bigger and heavier again as well as being much more expensive. For example, a 300mm f/2.8 lens may cost $10,000 or more, but a 300mm f/5.6 lens could be as cheap as $500.

As a rule, image brightness decreases as the focal length increases so many telephoto lenses or telezooms are described as being 'slow' because they may only have a maximum aperture of f/5.6 or maybe smaller. However, as the high ISO performance of today's mirrorless cameras steadily improves, it is more realistic to consider using a more affordable slower telephoto lens than a faster and more expensive one.

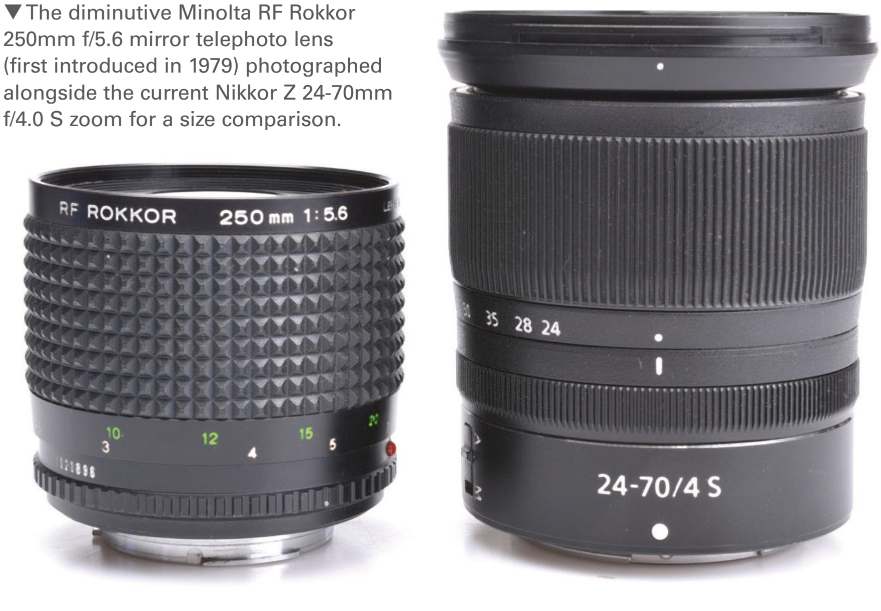
## Mirror, Mirror...

There is, however, a way around the size, weight and price of a very long focal length telephoto lens. It's called a mirror lens because it's all done with mirrors… well, mostly.

Mirror lenses have enjoyed various brief bursts of popularity particularly during the 1970s and '80s, but they've never really caught on, perhaps because their design does involve some comprises. However, they're still being made by a couple of lens manufacturers, notably South Korea's Samyang (and also sold under a number of other brand names in other markets), China's TT Artisan and Tokina which appears to be the most enthusiastic supporter. Currently, there are five Tokina mirror lenses in its SZ/SZX and SZ Pro lines, ranging from a 300mm f/7.1 to a 900mm f/11. They're available in numerous lens mounts, including Micro Four thirds which, of course, doubles the effective focal length. More about these shortly. In the past, Sigma, Tamron, Zeiss (for both Contax and Rolleiflex), Minolta, Mamiya, Nikon and Olympus have all built mirror telephoto lenses.

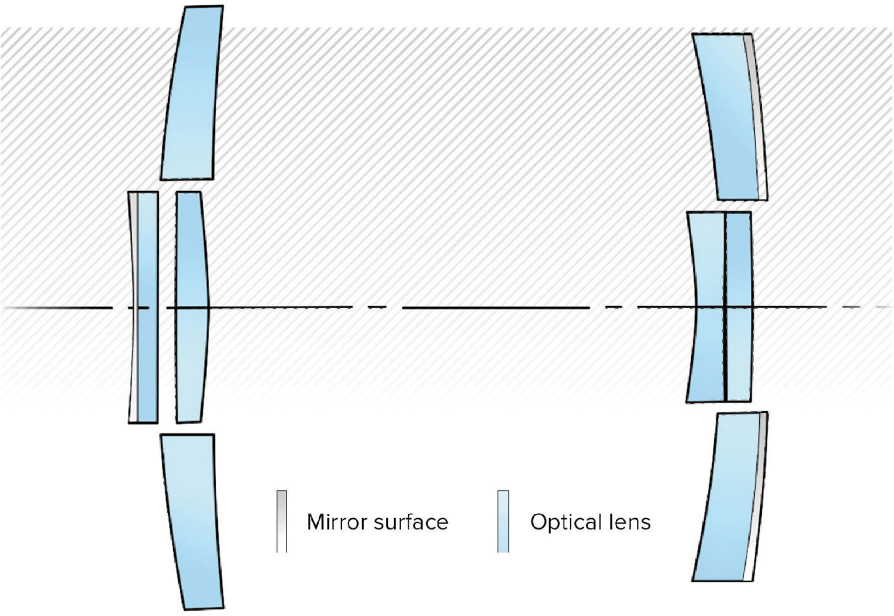
As the name implies, a mirror lens

▼The diminutive Minolta RF Rokkor 250mm f/5.6 mirror telephoto lens (first introduced in 1979) photographed alongside the current Nikkor Z 24-70mm f/4.0 S zoom for a size comparison.



> "What's immediately obvious is that the small size and light weight are great, but you need to remember that you're still shooting with a supertelephoto lens."

– which is also called a reflex lens – incorporates a pair of mirrors which replace many of the conventional elements (although a small number are still used). By reflecting the light rays back and forth inside the barrel, the mirrors effectively 'fold up' the focal length. Hence you can have a comparatively long focal length packed into a very short barrel and, as there's only two mirrors which replace many more elements, these lenses are also lighter weight in comparison to a conventional design. Technically, this is known as a catadioptric optical system as it employs both reflection using curved mirrors – catoptrics – and refraction using spherical lens elements – dioptrics. Light is initially reflected off the primary mirror at the back of the lens onto the much smaller secondary mirror at the front of the lens and then refractive elements finish the job. There are some design variations including using a concave-shaped element that's silvered on its rear surface – so it performs both reflection and refraction, with the latter actually happening twice – but the basic principles remain the same.



▲ Mirror telephoto lenses were particularly popular during the 1970s and '80s. The compact design is achieved by replacing a number of conventional refractive elements with two curved mirrors which effectively 'fold up' the focal length inside the barrel. This is the optical construction of the Tokina SZX Super Tele 400mm f/4.0 Reflex MF which is a mirror lens you can buy new.

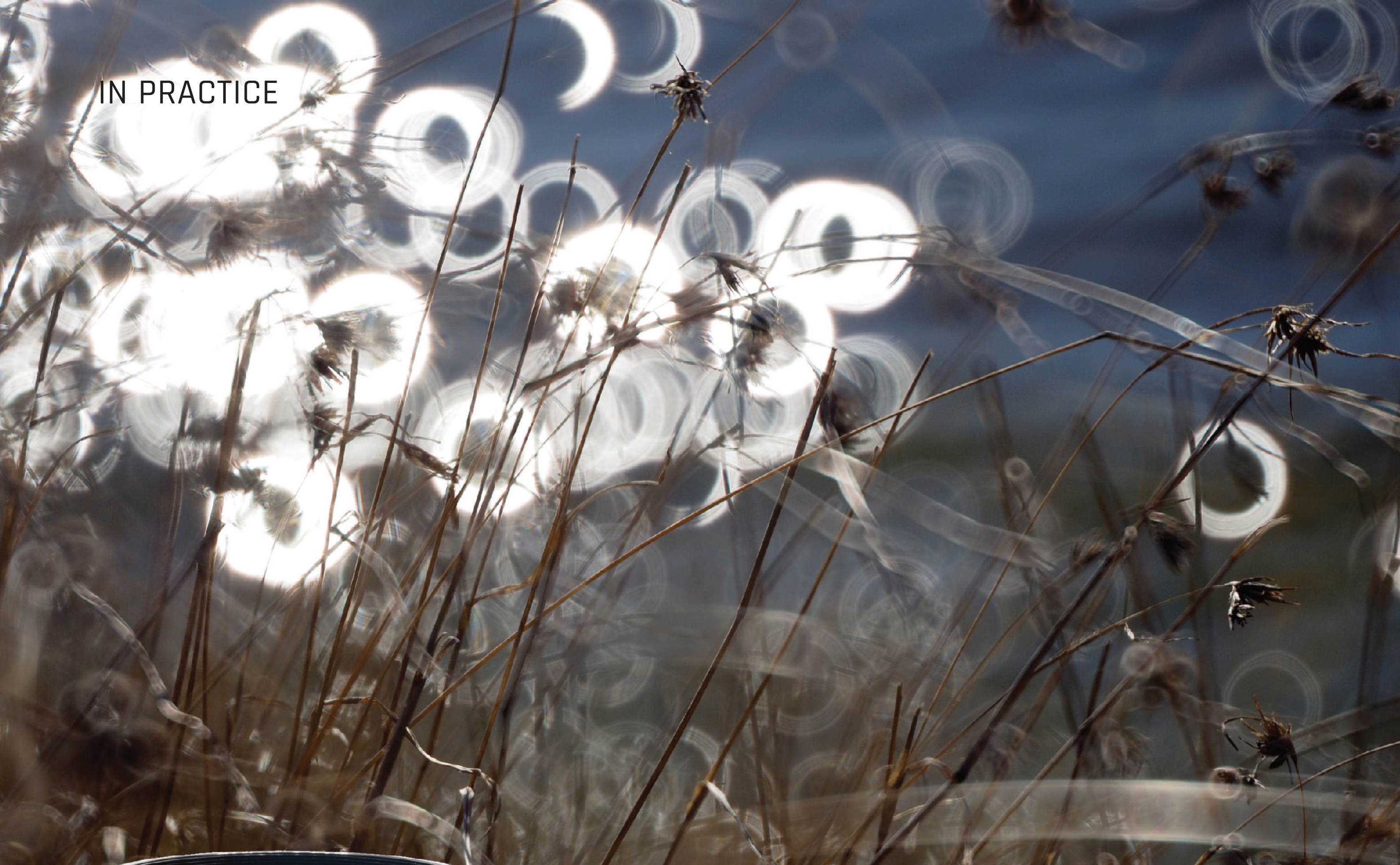
The earliest application – dating back, in fact, to the 17th century – was in astronomical telescopes because the folded optical path enabled significant reductions in their physical size and weight. In photographic catadioptric lenses, the secondary mirror – which has a convex surface – also serves to increase the focal length by up to a factor of four or five times. The downsides of a mirror lens are that it's not possible to incorporate a diaphragm – either automatic or manual – so you're limited to a fixed aperture, and it's difficult to include autofocusing so just about all models are manual focus. However, this means that, if you're using an older model mirror lens on a mirrorless camera, a passive mount adapter is all you need… and they're now available in numerous combinations so basically anything can be fitted to anything.

▼ The RF Rokkor 250mm f/5.6 attached to the OM System OM-1 Mark II via the Novoflex Minolta MD to Micro Four Thirds lens mount adapter. On a Micro Four Thirds format camera body, the focal length is effectively 500mm.

Certainly, manual focus shouldn't be so much of a deal-breaker, but the fixed aperture might be, accept that, as has already been noted, the high-ISO performance of today's mirrorless camera means that you can use this adjustment to help with exposure control along with shutter speeds… or switch to Auto ISO and let the camera do the work. And the focus peaking display that's now standard on current mirrorless cameras makes it much easier to focus accurately especially when there's minimal depth-of-field to play with.

In 1989, Minolta introduced the AF Reflex 500mm f/8.0 mirror lens which had autofocusing, but only with the later generations of its AF 35mm SLRs which had more sensitive PDAF sensors so they could still work at f/8.0 (but then still only with the centre point). Minolta subsequently introduced a 400mm version in the V mount for its Vectis S series APS (the film format) SLRs and, after Sony's takeover of the Konica-Minolta camera business in 2006, there was a Sony-badged version for its A mount DSLRs.

▲ The Minolta RF Rokkor 250mm f/5.6 is incredibly compact at a little under 60 millimetres in length. That's the back of the secondary mirror you can see at the centre of the front of the lens. The much bigger primary mirror is located at the rear of the lens.



▲ It's a bit extreme, but this image illustrates how a mirror lens creates distinctive doughnut-shaped out-of-focus effects. It can be messy – as is the case here – so focus (i.e. depth-of-field) and backgrounds need to be more carefully managed.

SZX
400mm F8 Reflex MF
Tokina
(1:15m)
1:2.5
1:3
1:3.5
Tokina

▲Tokina is the most enthusiastic supporter of mirror lenses at the moment. There's currently five models available from a 300mm to a 900mm, and in a variety of full frame and cropped frame mounts.

**Inset:** Tokin's 400mm f/8.0 mirror lens has surprisingly good close-up capabilities, delivering a reproduction ratio of 1:2.5 on a full frame camera and obviously even greater magnification with the cropped formats.

## Holding Steady

Of course, while the magnification power of a mirror tele at a particular focal length is the same as that of conventional lens so any camera shake is amplified accordingly, the smaller and lighter lens means that it's easier to hold steady at slower shutter speeds. You can't get optical image stabilisation into a mirror lens either, but as so many mirrorless cameras have in-body stabilisation this is also now less of an issue. Also on the plus side, the reductions in size and weight are significant.

Let's take Tokina's SZX Super Tele 400mm f/4.0 Reflex MF. It was originally designed for DSLRs, so the mirrorless mount versions have a short tube between the mount and the lens body itself to restore the longer flange back distance. Even so, the total length is still only millimetres in length, and it weighs a mere 355 grams. The screwthread filter fitting is 67 millimetres which also gives some idea about how compact this lens is. Tokina doesn't make a conventional 400mm prime telephoto for direct comparison, and we tried to find a slow one so the maximum aperture difference isn't so pronounced, but such an animal doesn't appear to exist anymore. However, Canon did once make a 400mm f/5.6 L series lens in the EF DSLR mount which will still serve as a good comparison of the dimensional differences.

It's 257 millimetres in length and weighs 1350 grams if you include the tripod mounting collar. Tellingly, over 30 years since it was launched in 1993, a pre-loved Canon 400mm f/5.6L can still fetch around $1000 if

XR RIKENON
600mm

▶ Quite a number of 35mm SLR lens systems included a mirror telephoto, including Nikon, Minolta, Olympus, Contax and Rolleiflex. This is Ricoh's XR Rikenon 600mm Reflex f/8.0 which uses the Pentax K mount and has a drop-in filter holder at the rear.

> "Digital capture makes the mirror lens much more of workable proposition than was ever the case with film."

it's in good condition. Brand new, the Tokina 400mm f/8.0 mirror lens is yours for not much over $400.

## Staying Focused

So, how do these significant plusses and minuses work out in practice?

Using the Tokina 400mm f/8.0 on a Fujifilm X-T5 – so the effective focal length is 600mm – what's immediately obvious is that the small size and light weight are great, but you need to remember that you're still shooting with a supertelephoto lens.

For starters, yes, it's very easy to hand hold, but you need to keep a close eye on the shutter speed – especially as f/8.0 is all you've got – even with the helping hand of IBIS. And even though you might be able to comfortably hand hold the lens, the practice presents challenges. Because of the very high magnification at an effective focal length of 600mm, no matter how steady you try to hold the lens, the image bounces round the viewfinder, making framing and composition more of a challenge. In the end, it's likely you'll resort to using a tripod because it's simply easier and also less tiring. Additionally, the depth-of-field is just so shallow – even with the smaller sized sensors – you need the camera to be on a tripod so that you can better concentrate on getting the focus absolutely right… a very tiny shift of the focusing collar makes a big difference. The focus peaking display is invaluable here, and at least you can get away with using a lighter weight tripod.

The Tokina 400mm f/8.0 has remarkably good close-up focusing capabilities – down to 1.15 metres which, at 400mm, gives a magnification ratio of 1:2.5 – but this is very definitely tripod territory as the depth-of-field is shallower again, and it's simply impossible to focus precisely otherwise.

## Doing Doughnuts

Optically, mirror lenses generally perform very well with good overall sharpness and contrast, minimal vignetting, very little distortion and – unlike a conventional refractive telephoto – virtually no chromatic aberrations because there are so few conventional elements. However, strong backlighting is any mirror lens's Achilles Heel and contrast is significantly reduced in these situations,

▲ Minolta RF Rokkor 250mm f/5.6 on Olympus OM-D E-M10 III. The effective focal length is 500mm.

▲ Tokina SZX Super 400mm f/4.0 Reflex MF on Fujifilm X-T5. The effective focal length is 600mm with the 'APS-C' size sensor so the very high magnification power can make framing and focusing more of a challenge.

▶ Tokina SZX Super 400mm f/4.0 Reflex MF on Fujifilm X-T5. Get the focus right and mirror lenses are extremely sharp.

> "Mirror lenses have virtually no chromatic aberrations because there are so few conventional refractive elements."

▲ Tokina SZX Super 400mm f/4.0 Reflex MF on Fujifilm X-T5. The depth-of-field is very shallow – even with the smaller size sensors – so the manual focusing requires precision. In many situations, using a tripod is a better option than hand-holding.

but on the plus side there's neither flare nor ghosting (again because there are so few lens elements).

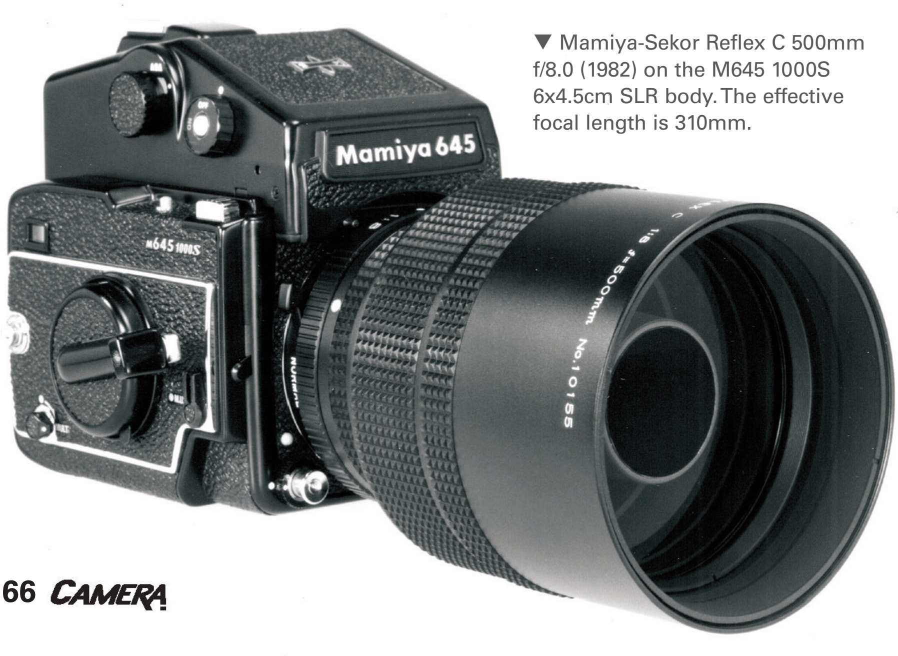
However, blocking caused by the secondary mirror's central positioning produces a distinctive doughnut-shaped out-of-focus effect which you either love or hate. Furthermore, given the inherently shallow depth-of-field – which you really can't do anything about given the fixed aperture – they're always present somewhere in the image. They can be quite distracting in a background so it's a case of composing and framing to minimise the effect, looking for plainer or more uniformly-toned backdrops, or trying to use the effect more creatively.

## A Little Goes A Long Way

A great example of the size reduction achievable with a mirror telephoto is a classic example – the Minolta RF Rokkor 250mm f/5.6 which is a MD mount lens. It's a mere 58 millimetres in length and weighs just 250 grams. Use it on a Micro Four Thirds mirror camera body via a mount adapter – as we have here – and the effective focal length is 500mm. As with the Tokina 400mm, the MD-to-MFT mount adapter adds a little extra length to the overall package, but we're still talking about a 500mm supertelephoto that measures less than 100 millimetres in length. And while the aperture is fixed, f/5.6 isn't all that slow… especially at 500mm.

Again, Auto ISO control can make up for the lack of adjustable apertures, but IBIS extends how low you can go in terms of slower shutter speeds when shooting handheld. If you're using the 1/focal length rule as a guide, remember that it applies to the effective focal length if the lens is being used on a cropped sensor body. In other words, without stabilisation, 1/500 second should be the slowest shutter speed that can be set with the RF Rokkor 250mm, but even just four stops of IBIS correction would get you down to 1/30 second. Nevertheless, at the longer effective focal lengths on a cropped sensor camera, the same caveats as those for using the Tokina lens apply… in many situations, it's simply easier to use a tripod

Digital capture in general – and the mirrorless camera configuration in particular – make the mirror lens much more of workable proposition than was ever the case with film, capitalising on the very significant reductions in size and weight while finding effective 'work arounds' for the design's main limitations. So there's potentially a new lease on life for some truly classic – and unusual – film era lenses while the new models that are available today provide an affordable entry to the exciting (if sometimes challenging) world of supertelephoto photography.



▼ Mamiya-Sekor Reflex C 500mm f/8.0 (1982) on the M645 1000S 6x4.5cm SLR body. The effective focal length is 310mm.

Tokina mirror lenses are distributed in Australia by C.R. Kennedy & Co., for more information visit **crkphotoimaging.com.au** Samyang mirror lenses are distributed in Australia by Maxxum Pty Ltd, visit **www.maxxum.com.au**

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# CANON AE-1

These are the cameras that, in one way or another, had a significant influence on photographers and photography. Canon's AE-1 brought camera automation to the masses and, in the process, built the brand.

During the 1960s considerable advances were made in micro-electronics – notably integrated circuits or 'microchips' – which would eventually have far-reaching effects on the design and manufacture of many consumer products. By the start of the 1970s, the race was on to incorporate these new technologies into cameras which, up until then, had been mechanical instruments.

The Pentax ES was the first 35mm SLR with automatic exposure control (an aperture-priority mode) and it appeared in 1971. Over the next couple of years, it was followed by many competitors with the gradual adoption of more electronics including LED viewfinder displays (introduced on the Fujica ST901 in 1974). Canon's first auto camera was the semi-pro EF introduced in 1974 which had a hybrid mechanical/electronic shutter.

The most significant advance came in 1976 when Canon unveiled the AE-1, now generally accepted as the first camera to employ a microprocessor to control its exposure operations. Following the AE-1, the initials 'CPU' were burned into the consciousness of 35mm SLR buyers although, as with all technological advances in photography, this increased automation was initially viewed with mistrust by many who believed mechanical cameras were more reliable. However, it wasn't just the use of a central processing unit which made the AE-1 different. Canon had noted the market's response to Olympus's OM-1 and also came up with a very compact and neatly-styled design. This was made possible as the introduction of microprocessor control eliminated around 300 parts, also reducing manufacturing costs. As would characterise later Canon designs, the ergonomics were also considerably improved as the company began to understand that, if the 35mm SLR market was to grow, then the cameras had to start appealing to a wider audience than just dedicated enthusiasts.

## Winning Start

While the Canon AE-1 was an important milestone in the development of the 35mm reflex camera, it was more the complete cohesiveness of its design and capabilities which resulted in its phenomenal success. It's also worth noting that, prior to the AE-1, Canon had not been a really significant player in this market, but this camera laid the foundations for the company's subsequent dominance of the 35mm SLR – and, later, the DSLR – market.

The AE-1 was also unusual in that it offered shutter-priority automatic exposure control instead of the more common aperture-priority auto which had been adopted by Canon's rivals because it was an easier route to take in terms of the lens mount. Canon introduced its FD lens mount in 1971 and this allowed full-aperture metering so adding auto aperture control was a fairly straightforward modification and on-going compatibility wasn't a problem either. Even when Canon dropped its breech-lock ring mounting arrangement in mid-1979 and introduced the New FD series lenses, both types could still be fitted to any Canon SLR body. However, the plethora of pins and levers on the back of an FD lens suggested Canon was already aware it could only go so far with mechanical couplings and at some stage it would be necessary to adopt an electronic 'interface'.

The AE-1 had centre-weighted average metering using a silicon photocell and the electronically-controlled shutter (which used cloth curtains) had timed settings from two seconds to 1/1000 second. The film transport was still manual, but an accessory winder could be fitted which gave 2.0 fps continuous advance. Another advantage of microprocessor control was dedicated flash operation which, with all Canon's A-series SLRs, could provide auto aperture and shutter speed setting (although TTL flash metering was still a little way off). The AE-1 also retained all the features traditionally demanded by the enthusiast including depth-of-field preview, PC flash terminal and interchangeable focusing screens.

Canon
AE-1
PROGRAM
CANON LENS FD 50mm 1:1.4
CANON
LENS MADE IN JAPAN

The Canon AE-1 Program (1981) built on the huge success of the original AE-1 and, together, the two models sold six million units.

By the time the up-dated AE-1 Program appeared in 1981, Canon had sold four million AE-1s and both models eventually exceeded six million units which is an achievement unlikely to ever be matched again.

In between these two models, Canon introduced the A-1 (1978) which was the first camera with microprocessor-controlled programmed exposure setting (although the Minolta XD-7/XD-11 from a year earlier was actually the first multi-mode 35mm SLR). Dubbed the "Sci-fi A-1" by Canon, the A-1 offered six exposure modes and incorporated around 20 microprocessor-derived technologies. To obtain the extra functions even more electronic integration was employed and the main CPU was about three times more powerful than the one installed in the AE-1. The camera actually employed five large-scale integrated (LSI) circuits and was the first to employ bus lines in which a variety of data could be transmitted along the same connection via a 'time sharing' arrangement. The A-1 also pioneered the use of multi-layered two-sided flexible substrates which rationalised wiring and enabled high-density component mounting to maintain compact camera dimensions. It also had a dynamic-type digital LED viewfinder display (previously all LED read-outs had been static) which again reduced the number of components needed and well as reducing power consumption. When the optional Motor Drive MA was attached, film advance could be a zippy as four frames per second.

The AE-1 Program built on the successes of both the AE-1 and the A-1. In addition to programmed exposure control, the new model also got an LED viewfinder display (replacing a needle-and-scale arrangement), an AE lock, an audible battery power checker and provisions for fitting the 4.0 fps MA motordrive.

The pursuit of greater automation soon turned to focusing and Canon's first foray into this technology was the AL-1 QF which arrived in 1982. The initials 'QF' stood for 'quick focus' and this model represented one of the first attempts at an autofocus 35mm SLR. The AL-1 used three CCD line sensors to perform passive distance rangefinding using contrast difference detection, but this information was merely used to generate focus assistance indicators in the viewfinder. Nevertheless, it was a step in the right direction and, in 1985, Canon took it further with the unloved (and unlovely) T80 in which had motorised lenses driven by the CCD distance-detection module in the camera body. Two years later, the EOS system was launched and its long-term success was very much rooted in the design philosophies and pursuit of technological advancement established with Canon's A-series 35mm SLRs.

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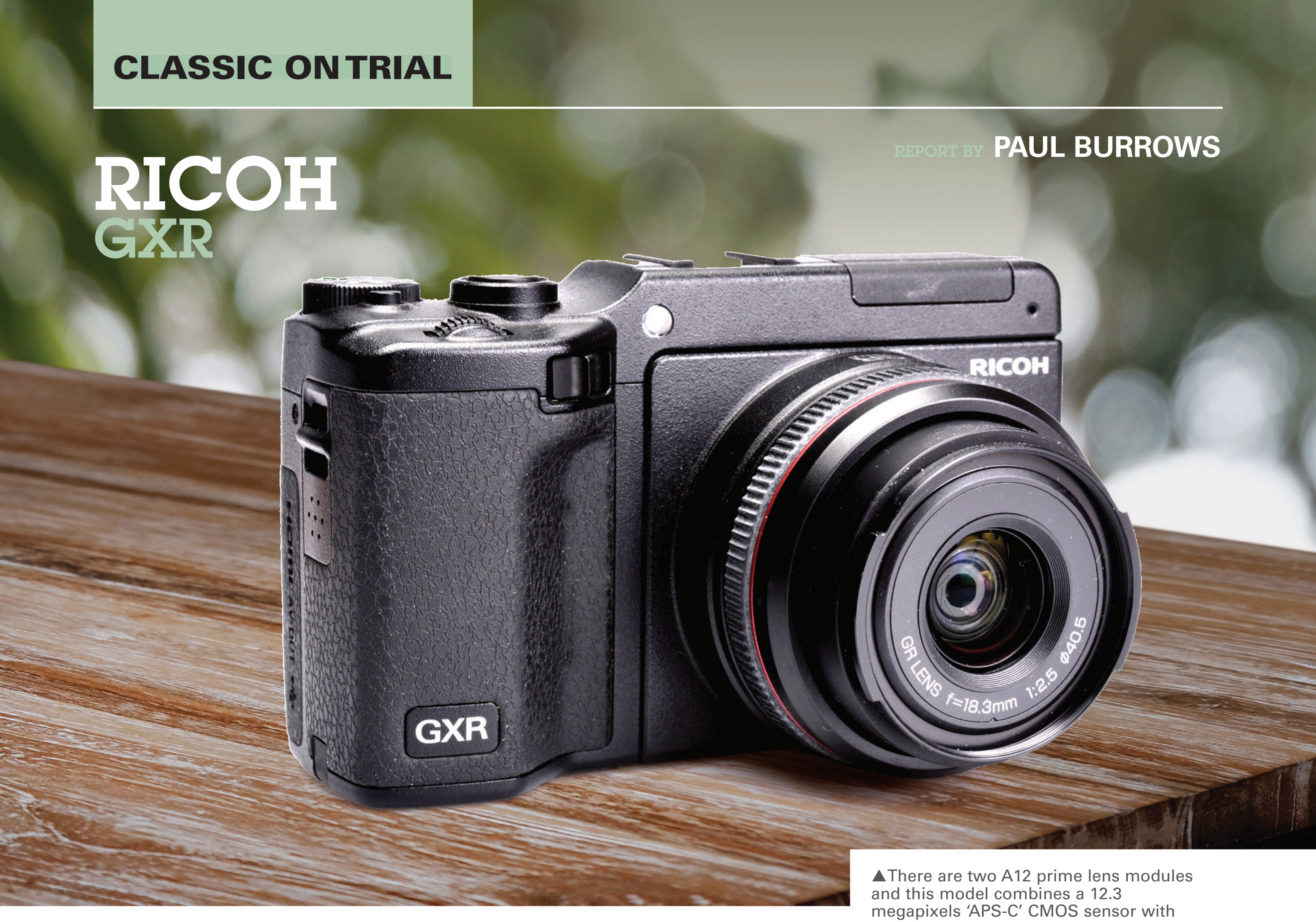
# RICOH
## GXR

REPORT BY **PAUL BURROWS**



▲There are two A12 prime lens modules and this model combines a 12.3 megapixels 'APS-C' CMOS sensor with an 18.3mm f/2.5 wide-angle lens which is equivalent to 28mm.

**Is it worth buying an older, used digital camera? It's a question we get asked a lot by readers and we've always erred on the side of 'no', but there are exceptions and Ricoh's unusual take on a mirrorless system from 2009 can still work today.**

It's the middle of 2009 and the photography world is starting to get to grips with a whole new breed of camera. First Panasonic at the previous year's Photokina and then Olympus repackaged the Four Thirds format sensor – now renamed Micro Four Thirds – into interchangeable lens cameras which did away with the traditional SLR mirror box and optical viewfinder. Panasonic opted for having an integrated electronic viewfinder in its Lumix G1 giving a design reminiscent of a very compact DSLR while the Olympus PEN E-P1 adopted a styling very similar to that of its Pen F half frame 35mm, but which didn't have an eyelevel viewfinder at all. Both these cameras were significantly smaller and lighter than even the most compact DSLR which was achieved partially by using the M43 sensor and also by eliminating the bulky reflex assembly at the heart of both film and digital SLRs. While the term 'mirrorless' is universally used now, early on, a widely-used classification was 'Compact System Camera' (CSC) which neatly summed up what they were… compact camera bodies in a system of lenses and accessories.

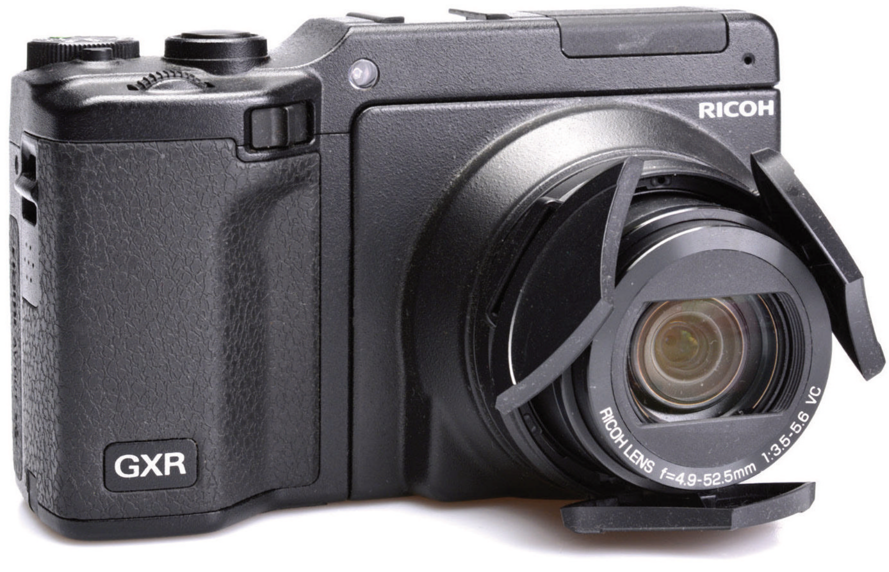
Nobody knew where CSCs were heading except that 'compact' was the big selling point for both the bodies and the lenses. Enthusiasts didn't really take them all that seriously and the early marketing was certainly aimed at the users of fixed-lens compacts who wanted to upgrade to something with more versatility. In January 2010, Samsung stepped up a sensor size with its 'APS-C' format NX-10 which was still very compact compared to any DSLR using this sensor size, but there was still a belief that smaller was better so Pentax introduced the Q line in June 2011 and the 1 Nikon system appeared just a couple of months later. The tiny Q series cameras were initially built around a 6.77x4.55 mm BSI CMOS which represented a crop factor on the 35mm format of 5.53x. The 1 Nikon system was based on a 13.2x8.8 mm sensor with a crop factor of 2.7x.

### PERFECT MATCH

At the end of 2009, Ricoh was hedging its bets with an unusual mirrorless camera system that actually used a number of sensor sizes. The GXR body unit was basically just a handgrip with a fixed monitor screen, a built-in flash and all the external controls which included the shutter release and a main mode dial. Everything else was contained in a series of interchangeable modules which Ricoh called 'Camera Units' and these combined a sensor and a processor with either a prime or zoom lens plus a leaf-type shutter.

These modules were completely sealed so there could be no issues with dust getting on the sensor. Additionally, the optics of the lenses were specifically matched to the sensors, also making use of smaller imagers to obtain longer effective focal lengths. There were eventually six modules of which four had 'APS-C' sensors – including an M mount unit – while two used compact camera sensors – namely 1/2.3-inch and 1/1.7-inch. The latter – which was a CCD – was designated P10 and allowed for an effective 28-300mm f/3.5-5.6 superzoom that was very compact indeed. The former, called the S10, had a BSI-type CMOS mated with a zoom equivalent to 24-72mm f/2.5-4.4 which was also exceptionally compact. In both cases, the '10' referred to the effective resolution in megapixels. There were two A12 modules – so, 'APS-C' sensors with an effective resolution of 12.3 megapixels – with prime lenses; namely (effectively) a 50mm f/2.3 and a 28mm f/2.5. The M mount unit used a similar sensor with the same resolution and then, finally, there was the A16 module which combined a 16.2 megapixels 'APS-C' sensor with a 24-85mm f/3.5-5.5 zoom, and was the biggest and bulkiest of them all.

It was possibly the A16's size that suggested what had looked like a clever idea at the time of its launch maybe couldn't be developed very much further. There was also a bit of an identity crisis – was it really only a compact camera with some added versatility or something more serious? And the pixel war was raging which raised the issue of how upgrades might be handled… you'd have to buy a new lens as well as the higher-res sensor and faster processor. It would have been easy to update the body with, for example, an adjustable monitor screen, but down the track, it started to become obvious that the module concept would be problematic, particularly in terms of implementing new technologies. In a way then, its advantages were also its disadvantages. Perhaps after the megapixel race calmed down and the resolution of 'APS-C' sensors settled at where it is now – in the region of 20 to 26 MP – there might not have been so much of an imperative to upgrade the modules, but as we're now seeing, it's more about more powerful processors which can perform complex functions such as AI-based subject recognition.



▲ The P10 'camera unit' is very compact, but houses what's effectively a 28-300mm zoom. Obviously this is made possible by using a small sensor, the 10 MP BSI-CMOS still performs pretty well. This module also incorporates image stabilisation via sensor shifting.

> RICOH'S ORIGINAL ROAD MAP HAD PLANS FOR UP TO 20 LENS MODULES AND THERE WAS TALK OF FULL FRAME UNITS DOWN THE TRACK, BUT IN THE END THERE WERE JUST FIVE PLUS THE M MOUNT MODEL."

The Ricoh GXR system was launched at the end of 2009 and the last new module, the A16, in February 2012 by which time Panasonic, Sony, Samsung and Olympus were building mirrorless camera systems with bigger choices of lenses and bodies with more features and better capabilities. Furthermore, the competition was hotting up with the arrival in early 2012 of Fujifilm's X mount system – introduced with the X-Pro1 – and then, mid-year, Canon's EOS M system, both using 'APS-C' size sensors.

Slowly but surely the formula for mirrorless cameras was taking shape and it was evolving to use only the 'mainstream' sensor sizes – the first full frame bodies were not far away – and a conventional lens mount. More significantly, what had initially been considered an ILC category supplementary to DSLRs was emerging as their replacement… and the Ricoh GXR was never going to stack up here.

Ricoh's original road map had plans for up to 20 lens modules and there was talk of full frame units down the track, but in the end there were just five plus the M mount model. There were also ideas for other components that could use the 68-pin

▲ Built-in pop-up flash is low-powered, but the system included an accessory flash unit called the GF-1.

▲ GXR body units carries all the external controls which follow a pretty conventional layout with a main mode dial, input wheel, a four-way keypad and various function buttons. There's some scope for customization.

▲ The mechanical coupling between the GXR body and the camera modules is extremely robust, and unlikely to be even worn on used examples.

connection, including a projector, a large capacity data storage unit and a mini photo printer that would have turned the GXR into an instant camera, but none of these went into production. After no new product activity for over three years, the system was finally announced as discontinued in late 2015.

▲The A12 M Mount 'extension' unit combined the Leica M mount with a modified version of the 12.3 MP 'APS-C' sensor and a focal plane shutter. The sensor had a different microlens array to optimise imaging with M mount rangefinder lenses. Additionally, it goes without an optical low-pass filter.

## INTO THE PRESENT

However, none of this history prevents the GXR being a really interesting proposition today, not just because the concept still has merit, but because it actually works well as a compact interchangeable lens camera system. If you accept that 'it is was it is', the GXR has plenty going for it and it's a lot of fun to use.

The A16 module obviously delivers the most resolution compared to contemporary 'APS-C' mirrorless cameras and its 24-85mm zoom performs well. However, 12.3 megapixels is still a reasonably useful amount of resolution for many applications and both the prime lenses are very good indeed with the 50mm also labelled 'macro' as it focuses down to seven centimetres which gives a maximum magnification ratio of half life size. With RAW capture – which uses the Adobe DNG format – the A12 modules deliver a file size of around 20 MB (depending on the subject content, of course) and a maximum JPEG quality of close to 5.0 MB. The A16 unit – which uses a Sony-made sensor – generates average file sizes of 24 MB and 6.0 MB respectively.

▲ Clip-on VF-2 EVF is adjustable for tilt and worth tracking down as it makes the GXR much more enjoyable to use.

▶The electronic connection is via a 68-pin databus on each component which are on flexible mounts and essentially 'float' so they aren't mechanically stressed.

Arguably, the most interesting of the GXR modules is the Mount A12 unit which, as noted earlier, combines the Leica M mount with a modified version of the 12.3 MP 'APS-C' sensor which doesn't have an optical low-pass (or anti-aliasing) filter. Additionally, it has both a focal plane shutter with a top speed of /4000 second and a sensor-based shutter which runs up to 1/8000 second. Of course, there's a focal length magnification factor of 1.5x – as there was with the Leica's M8 – but otherwise, this module turned the GXR into a very neat little digital M mount camera… not to mention a comparatively affordable one too. Better still, the GXR body can be fitted with a plug-in EVF – the compact VF-2 – which is tilt-adjustable and has a resolution of 920,000 dots (same as the monitor screen), but obviously looks a lot sharper because of the much smaller screen. The VF-2 is handy with any of the lens modules, but makes an M mount GXR into a great little package… and the system is young enough to have a focus peaking display to assist with manual focusing. It's only in white and at a single intensity, but it's still more useful than the classic rangefinder in terms of showing exactly what's sharp and what isn't. There's a second option which renders the live view the image as a B&W negative so it's easier to see the peaking display – but obviously it needs to be switched on and off – so the colour mode is more convenient. Alternatively, there's a magnified image display with settings of 2x, 4x or 8x.

Not surprisingly, the M mount module was a big hit and possibly helped sell more GXR body units than any of the others. Indeed, initially Ricoh had plans for more of what it called 'extension units' with mounts primarily for fitting legacy lenses. These lens mount modules could have been a way to keep the system going, perhaps with the updated body suggest earlier. A K mount option would have made a lot of sense, but Ricoh had purchased Pentax in July 2011 and the Pentax K-01 – a K mount mirrorless camera – was launched in February 2012 so avoiding competitive products may have stymied that idea. Also, licensing would likely have been an issue, although it wouldn't be too long before Sony was handing out E/FE mount invitations to all and sundry, and the M43 group would likely have welcomed a new member of Ricoh's calibre.

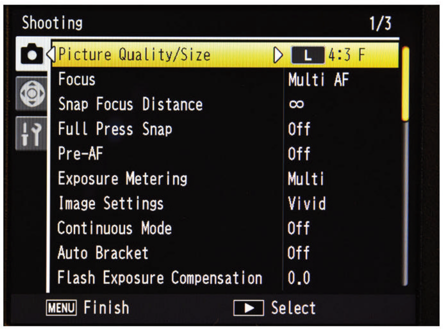
▶The S10 'camera unit' is the only one in the GXR system to use a CCD-type sensor.

## STILL GOOD

Despite the earliest components of the system now being over 15 years old, the Ricoh GXR doesn't lag so very far behind compared to today's compact mirrorless cameras as far as still photography is concerned.

Video, of course, is another story and this is where a lot of the recent progress has been made, but it was a feature yet to gain any traction at the end of the 'noughties'. The best you can get is HD res (i.e. 720p and not Full HD) at either 24 or 30 fps in either MPEG-4 or AVI Motion JPEG depending on the lens module, and only with mono sound via the built-in mic. There's no manual controls – except, of course, for focusing when you're using the M mount module – and no connection for an external microphone so, even when it was new, video wasn't the GXR's strong point.

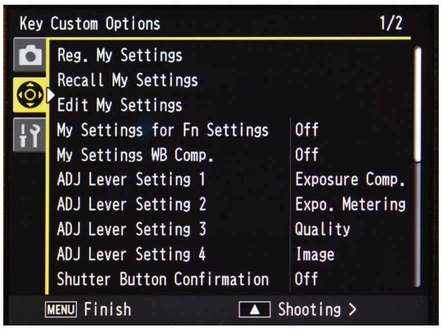
For photography, the period features are contrast-detection AF with nine measuring points, continuous shooting speeds of between 2.5 and 5.0 fps depending on the module, and a less-than-logical menu layout. However, the AF is still reasonably brisk and there's a handy 'Snap Focus' mode which can be preset to one of eight distance settings from one metre to infinity which are automatically set – virtually instantaneously – when the shutter is button is depressed (and with half-press or full-press options). This feature continues in the current Ricoh GR IIIx fixed-lens compacts as does the multi-point white balance measurement which was actually first introduced in the CX series compacts. This takes multiple measurements across the frame and the colour balance is then adjusted area by area rather than by applying an average setting. This takes into account that different parts of a scene are often differently illuminated or have different colour balances (i.e. broad sunlight and shadow). There's auto bracketing for white balance as well as exposure, ISO and for colour whereby three frames are recorded, one in the preselected colour, one in B&W and one with a preset monochrome tint. The colour setting options are Vivid, Standard and Natural, but you can create two of your own, while the toning/tint effects for B&W are sepia, red, green, blue and purple. The Scene modes include the staples for portraiture, landscapes, close-ups, sports action and night photography while, later, special effects were added via a firmware upgrade and these included Soft Focus, Cross Process, Toy Camera, Miniaturise and High Contrast B&W.



Shooting 1/3

| | |
|---|---|
| Picture Quality/Size | L 4:3 F |
| Focus | Multi AF |
| Snap Focus Distance | ∞ |
| Full Press Snap | Off |
| Pre-AF | Off |
| Exposure Metering | Multi |
| Image Settings | Vivid |
| Continuous Mode | Off |
| Auto Bracket | Off |
| Flash Exposure Compensation | 0.0 |

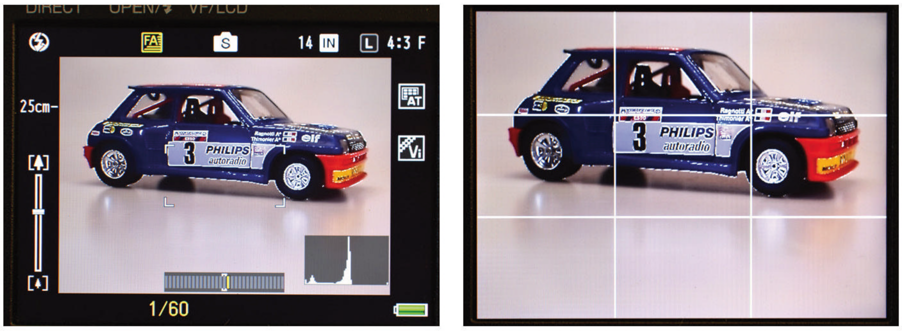
▲ Menu system is definitely a period piece. The typeface is tiny, there are only three tabs (so each covers numerous items) and there's no scrolling.



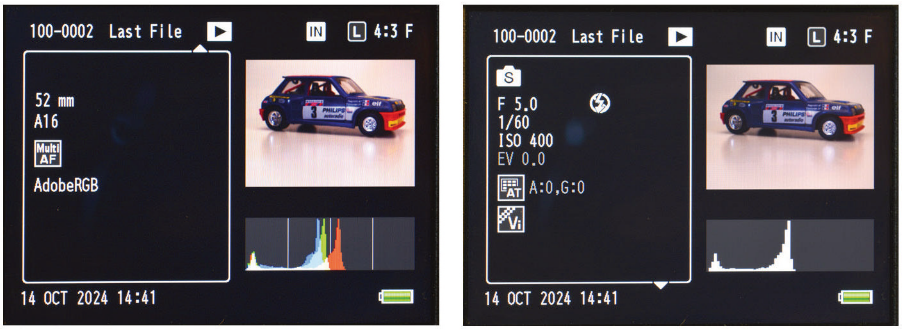
Key Custom Options 1/2

| | |
|---|---|
| Reg. My Settings | |
| Recall My Settings | |
| Edit My Settings | |
| My Settings for Fn Settings | Off |
| My Settings WB Comp. | Off |
| ADJ Lever Setting 1 | Exposure Comp. |
| ADJ Lever Setting 2 | Expo. Metering |
| ADJ Lever Setting 3 | Quality |
| ADJ Lever Setting 4 | Image |
| Shutter Button Confirmation | Off |

▲ Customising options include an 'Adjust' lever which enables you to have quick access to key capture staples such as ISO, white balance and exposure compensation.



▲ Live view displays are as you'd expect to find on any current mirrorless camera with elements including a real-time histogram, dual-axis level indicator and guide grids.



100-0002 Last File ▶ IN L 4:3 F

52 mm
A16
Multi AF
AdobeRGB

14 OCT 2024 14:41

100-0002 Last File ▶ IN L 4:3 F

F 5.0
1/60
ISO 400
EV 0.0
A:0,G:0

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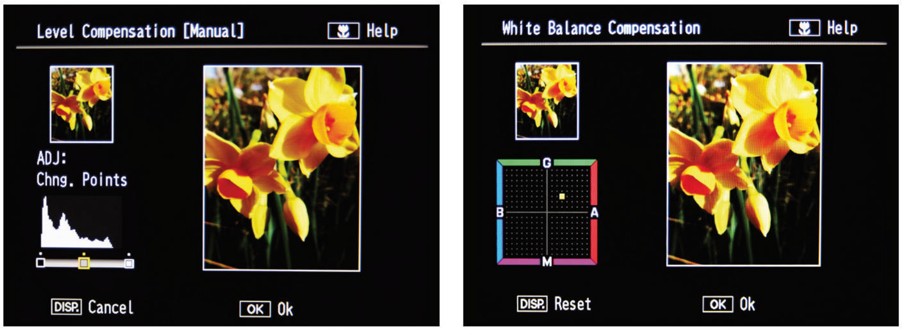
▲ Replay/review screens include a couple of info pages.



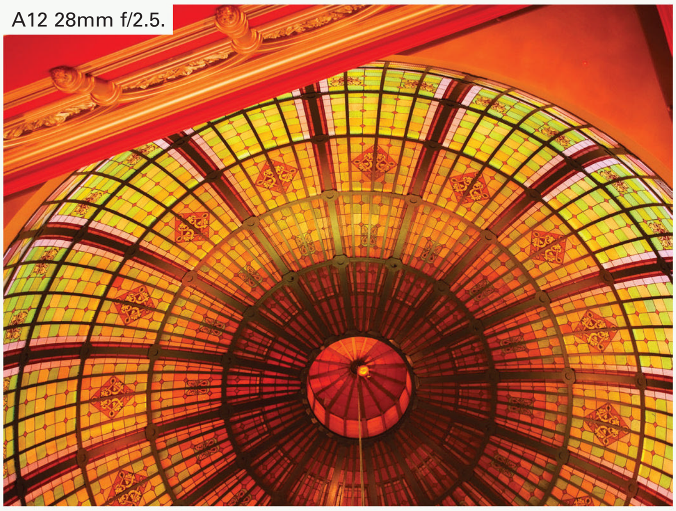
▲ Handy in-camera image editing functions include Level Compensation (either auto or manual, as per Photoshop) and White Balance Compensation.

By today's standards the GXR is still pretty well featured including with all the manual controls and overrides you'd expect on a new mirrorless camera. There's noise reduction, high ISO noise reduction (adjustable for threshold from ISO 200 to 3200), dynamic range expansion, white balance correction (set via a colour square), distortion correction and auto aperture or shutter speed shifting (depending on the exposure mode). Post capture, you can edit in-camera with Auto/Manual Levels Corrections (which works the same way it does in Photoshop), White Balance Compensation and Skew Correction. There's also an intervalometer (set for up to 99 frames or unlimited), a programmable self-timer and copyright info input.

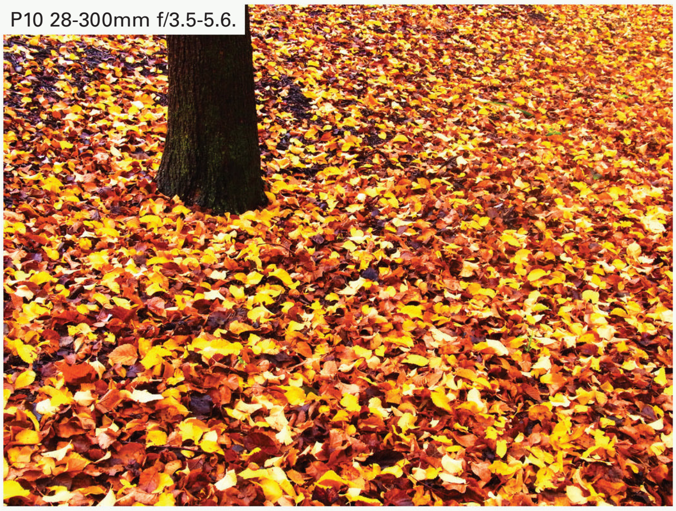
## IN THE HAND

Even with the bulkiest A16 module fitted, the GXR is still a very compact camera. The main body dimensions aren't far off those of the GR III models, but obviously the lens units add extra depth… although not very much in the case of the S10 and P10. Add-

A12 28mm f/2.5.



P10 28-300mm f/3.5-5.6.



S10 24-72mm f/2.5-4.4.

A16 24-85mm f/3.5-5.5.

Mount A12 with Voigtländer 12mm f/5.6 Ultra-Wide Heliar (18mm effective focal length).

MIND THE GAP

Mount A12 with Voigtländer 12mm f/5.6 Ultra-Wide Heliar (18mm effective focal length).

GXR
RICOH
GR LENS
f=33mm 1:2.5 MACRO

▲The A12 module with a 33mm f/2.5 lens is equivalent to 50mm and has close-up focusing which delivers a maximum magnification ratio of 1:2 or half life size. It uses the same 12.3 MP sensor as the 28mm unit.

on EVFs always look a bit clumsy, but it's definitely worth having so worth tracking down if you're looking at a preloved body without one.

At the time of the system's launch, Ricoh emphasised the reliability and durability of the 68-pin interface and the guide rail arrangement that ensures a reliable coupling between the GXR body and the lens units. It's not entirely goof-proof because you can misalign the two components and they'll still lock into place, but it should be very obvious visually and, in case you still miss it, the camera refuses to play ball until you do something about it. The coupling is undoubtedly massively over-engineered so it's hard to see even a well-used system having any issues, but the design did prevent weather-proofing and make sure you get the clip-on rubber dust covers for both the modules and the body units… these are as important as lens and body caps.

The external control layout is conventional with a main mode dial, a front input wheel and a rear 'ADJ' adjustment lever, a four-way keypad on the back panel and a small scattering of function buttons. There are two dedicated multi-function controls – the left/right pad actions – which can be assigned from a load of stuff plus four 'ADJ' lever settings for various capture-related settings including ISO, white balance, exposure compensation, the auto bracketing mode and much more. You can then cycle through what's been assigned so you can set it up to enable quick on-the-fly adjustments of those key exposure and white balance settings. Not as quick as if you had touch screen controls, but still pretty efficient.

The monitor screen itself is showing its age with its now comparatively low resolution and fixed position, but it works well enough. More of a challenge is the tiny typeface that Ricoh used in the menus and displays with both the GXR and the CX-series compacts. The menu layout comprises just three tabs so you'll spend a lot of a time searching for things until you become familiar with where they are, but you can create up to three sets of 'My Settings' which are then selectable via the main menu dial. The customisable 'ADJ' level mentioned earlier also cuts down the number of times you'll need to trawl the menus when shooting. However, the undoubted convenience of 'My Menu' pages was still before the GXR's time. However, the displays still include all the essentials – a dual-axis level display, a real-time histogram, a highlight warning and a choice of guide grids.

In practice then, the user experience isn't so very much different from a current mirrorless camera, but minus the efficiencies of a touch screen monitor and a better-organised menu system. Basic set-up and operation will be familiar no matter what else you've been shooting with.

## PERFORMANCE

Speed-wise, the Ricoh GXR is very much of its day and, of course, we've been treated to some significant advances in both AF performance and continuous shooting frame rates over recent years. It's not quick, but if you're thinking street photography or something very compact, but capable to travel with then it's fast enough. Of course, if you're using the M mount module then the AF speed isn't an issue. In terms of exposure control and white balance, the GXR is still more of a modern than a classic.

▼The A16 was the highest resolution lens module in the system, and also the last. The 16.2 megapixels 'APS-C' CMOS sensor is matched with a 15.7-55.5mm f/3.5-5.5 zoom equivalent to 24-85mm.

GXR
RICOH LENS f=15.7-55.5mm 1:3.5-5.5 ⌀55

The R/GR series of 35mm subcompacts built a cult status on their combination of portability and performance with a big part of the latter being the lenses. These were so good that, in fact, a small batch of 21mm f/3.5 ultra-wide from the 35mm GR21 (2001) was offered as a manual-focus version with a Leica L39 screw mount. The dedication to high-quality optics continued with the GR lenses for the GXR which, apart from being each optically matched to the sensor, are very highly corrected to give excellent uniformity of sharpness and brightness. There is undoubtedly some digital correction going on too, again specific to the lens and sensor combo. Consequently, the A12 primes, in particular, are exceptionally strong performers optically and well corrected for both distortion and chromatic aberrations. The 24-85mm is the pick of the zooms and is again very well corrected. It's versatile too, and the 16.2 megapixels sensor delivers plenty of well-defined detailing along with smooth tonal gradations. Of course, noise reduction processing for JPEGs is something else that's progressed in leaps and bounds since the GXR system components were new, so none of the sensors have sensitivity ranges that extend beyond ISO 3200, and only the A16 is capable of anything like the high ISO performance that we'd expect today. Best-quality JPEGs look fine up to ISO 800 and still pretty good at ISO 1600 which is also true of the A12 sensors, but even ISO 800 is pushing things with the S10 and P10 units with their tiny imagers… although the latter's 28-300mm equivalent zoom is brilliantly packaged and hugely versatile.

## THE VERDICT

If there had been a GXR II body with a higher res, tilt-adjustable monitor and at least a couple of 24 MP 'APS-C' lens modules, Ricoh's concept would still arguably be in the mix as a compact

◀Test images captured as JPEG/large/fine files with A16 24-85mm, A12 28mm, P10 28-300mm and S10 24-72mm lens modules (as captioned). A12 M mount module fitted with a Voigtländer 12mm f/5.6 Ultra-Wide Heliar ultra-wide prime (effective focal length is 18mm).

mirrorless camera system. The biggest impediment to long-term progress was forcing users to buy a new lens with a new sensor, and while a bunch of mount units – let's say, K, E and M43, along with M – might have worked, what looked like a bright idea at the start quickly lost its appeal after you bought into it… if only because the conventional systems from the likes of Canon, Panasonic, Samsung, Olympus and Sony were soon all offering more for less. However, it's that original appeal that makes the GXR worth looking at today because the concept did work and, now you know the history and so don't have any great expectations for anything more, it still works.

With the 28mm and 50mm modules, the overall package is very compact, but with great quality optics and enough resolution for plenty of applications especially, as it now happens, anything you might want to do online such as social media. The M mount module is also worth considering and, of course, you can fit other classic MF lens via an adapter. This unit turns the GXR into a nifty little digital RF camera that's actually a whole lot of fun to use, especially with the VF-2 EVF. The A16's extra resolution brings the GXR even closer to current image performance levels and, while it lacks any of the camera tech that's appeared over the last date, it still has all the basics and quite a few frills too. Importantly, there's all the manual controls and overrides for the experienced shooter to effectively deal with focus, exposure and white balance, plus enough for a bit of creative dabbling such as picture controls – the B&W mode is noticeably filmic in its look – and special effects, especially if all the firmware upgrades have been done (and there were quite a few of them along the way).

On one hand, it's easy to see why, at the time, Ricoh thought that the GXR was a good idea, and it's equally easy to see why it would have been apparent from quite early on that it really wasn't. But it hasn't been a total failure because, while it may be even more of a curiosity today, it's also still surprisingly workable and, better still, a great deal of fun to use.

There are a few other unusual choices if you want to relive the early days of mirrorless cameras, including the Pentax Q and 1 Nikon miniature systems, but nothing is quite as unique as the Ricoh GXR.

## VITAL STATISTICS

## RICOH GXR + CAMERA UNITS

Type: Fully automatic mirrorless digital camera with 68-pin databus connector for fitting lens modules and accessory units.

Lenses: A12/50mm module = 33mm f/2.5 macro (equivalent to 50mm). S10 = 5.1-15.3mm f/2.5-4.4 zoom (equivalent to 24-72mm). A16 = 15.7-55.5mm f/3.5-5.5 zoom (equivalent to 24-85mm). P10 = 4.9-52.5mm f/3.5-5.6 zoom (equivalent to 28-300mm). A12/28mm = 18.3mm f/2.5 wide-angle (equivalent to 28mm). A12 mount = Leica M bayonet lens mount.

Focusing: Automatic using contrast-detection via imaging sensor and with multi-point, spot and 'Snap' modes. Manual focusing override provided. Low light/contrast assist provided by a built-in illuminator on the GXR body. Manual focusing on lenses mounted via the A12 M mount module.

Metering: 256-segment multi-zone, centre-weighted average, spot and TTL flash.

Exposure Modes: Program (with shift), aperture-priority auto, shutter-priority auto and manual. Six Scene Modes – Movie, Portrait, Sports, Landscape, Nightscape and Skew Correct. Additional Scene Modes added after a firmware upgrade – Soft Focus, Cross Process, Toy Camera, Miniaturise and High Contrast B&W.

Shutter:

- A12 50mm/28mm modules = Electronic leaf type, 180-1/3200 second (plus 'B' and 'T' via a firmware upgrade). Flash sync up to 1/160 second. =  
  A12 M mount = Electronic focal plane, vertical travel, metal blades, 180-1/4000 second plus 'B' and 'T'. Flash sync up to 1/180 second. Also sensor shutter with a speed range of 1-1/8000 second.
- S10 = Electronic leaf type, 180-1/2000 second (plus 'B' and 'T' via a firmware upgrade). Flash sync up to 1/160 second.
- A16 = Electronic leaf type, 180-1/3200 second plus 'B' and 'T'. Flash sync up to 1/160 second.
- P10 = Electronic leaf type, 30-1/2000 second (plus 'B' and 'T' via a firmware upgrade). Flash sync up to 1/160 second.

All have exposure compensation up to +/-4.0 EV in 1/3 or ½ or stop increments.

Viewfinder: No built-in viewfinder. Viewfinding via fixed LCD monitor screen which has scale/grid, real-time histogram and info displays plus a zoom function. Optional Ricoh VF-2 EVF attaches to hotshoe plugs into dedicated connection.

Flash: Built into camera body with auto, red-eye, slow sync, second curtain sync, exposure compensation and manual modes (power adjustable down to 1/64). External flash units connect via hotshoe.

Additional Features: AE/AF lock, auto exposure bracketing, auto aperture shift, dual-mode self-timer (5 to 10 second delays, 1 to 10 frames), intervalometer, depth-of-field preview, auto power-off.

DIGITAL SECTION

Sensor:

- A12/50mm module = CMOS, 15.7x23.6 mm, 12.3 megapixels effective, sensitivity equivalent to ISO 200-3200
- S10 = CCD, 5.7x7.6 mm, 10.0 megapixels effective sensitivity equivalent to ISO 100-3200.
- A16 = CMOS, 15.7x23.6 mm, 16.2 megapixels effective, sensitivity equivalent to ISO 200-3200 (extendable to ISO 100). No optical low pass filter.
- P10 = BSI CMOS, 7.59 mm, 10.34 megapixels effective, sensitivity equivalent to ISO 100-3200.
- A12/28mm = CMOS, 15.7x23.6 mm, 12.3 megapixels effective, sensitivity equivalent to ISO 200-3200.
- A12 mount = CMOS, 15.7x23.6 mm, 12.9 megapixels effective, sensitivity equivalent to ISO 200-3200 (expandable to ISO 100). No optical low pass filter.

Focal Length Magnification: A12/50mm = 1.5x. S10 = 4.7x, A16 = 1.5x, P10 = 5.7x, A12/28mm = 1.5x, A12 mount = 1.5x.

Formats/Resolution: Two JPEG compression settings on six resolution settings at 4:3 (S10 and P10) or 3:2 aspect ratio (All A12 modules and A16). RAW output (Adobe DNG format). Choice of 16:9, 3:2 and 1:1 aspect ratios. A16 = 4352x3264, 3072x2304, 2592x1944, 2048x1536, 1280x960 and 640x480 pixels. A12 modules = 3776x3832, 3072x2304, 2592x1944, 2046x1536, 1280x960, and 640x480 pixels. S10 = 3648x2736, 3264x2448, 2592x1944, 2046x1536, 1280x960, and 640x480 pixels. 24-bit RGB colour for JPEGs, 36-bit RGB colour for RAW files. P10 = 3648x2736, 3264x2448, 2592x1944, 2048x1536, 1280x960 and 640x480 pixels

Video Recording: A12/50mm = AVI Motion JPEG format at 1280x720 pixels, 24 fps and 16:9 aspect ratio. Also at 640x480 and 320x240 pixels at 24 fps. WAVE format mono sound. Movie clips limited to a maximum file size of 4.0 GB (equivalent to around 12 minutes in HD mode).

S10 = AVI Motion JPEG format at 640x480 and 24 fps. Also at 320x240 pixels nd 24 fps. WAVE format mono sound. Movie clips limited to a maximum file size of 4.0 GB.

A12/28mm = MPEG 4 format at 1280x720 pixels, 24 fps and 16:9 aspect ratio. Also at 640x480 and 320x240 pixels at 24 fps. WAVE format mono sound. Movie clips limited to a maximum file size of 4.0 GB (equivalent to around 12 minutes in HD mode).

A12 M mount = AVI Motion JPEG format at 1280x720 pixels, 24 fps and 16:9 aspect ratio. Also at 640x480 and 320x240 pixels at 24 fps. WAVE format mono sound. Movie clips limited to a maximum file size of 4.0 GB (equivalent to around 12 minutes in HD mode).

P10 = AVI Motion JPEG format at 1280x720 pixels, 30 fps and 16:9 aspect ratio. Also at 640x480 and 320x240 pixels at 30 fps. WAVE format mono sound. Movie clips limited to a maximum file size of 4.0 GB (equivalent to around 12 minutes in HD mode).

A16 = MPEG-4 format at 1280x720 pixels, 30 fps and 16:9 aspect ratio. Also at 640x480 and 320x240 pixels at 30 fps. WAVE format mono sound. Movie clips limited to a maximum file size of 4.0 GB (equivalent to around 12 minutes in HD mode).

No input connection for an external microphone on any module.

Recording Media: SD/SDHC memory cards plus 86 MB of internal memory.

Continuous Still Shooting: A16 = Up to 14 JPEG/large/fine frames at up to 2.5 fps or three RAW files. A12/50mm = Up to 15 JPEG/large/fine frames at up to 3.0 fps or four RAW files. A12/28mm = Up to 15 JPEG/large/fine frames at up to 4.0 fps or five RAW files. A12 M mount = Up to 15 JPEG/large/fine frames at up to 3.0 fps or four RAW files. S10 = up to 15 JPEG/large/fine frames at up to 1.6 per second or five RAW files. P10 = Up to 15 JPEG/large/fine frames at up to 5.0 fps or five RAW files.

White Balance: TTL measurement via image sensor. Auto, auto with multi-point measurement, four presets, one custom preset, compensation (amber-to-blue, green-to-magenta), manual (via CT scale) and auto WB bracketing.

Interfaces: USB 2.0, AV output (NTSC/PAL) and HDMI mini.

Additional Digital Features: 7.62 cm LCD monitor (920,000 pixels), electronic level indicator, 'Direct' screen for status displays and changing settings, three customised camera set-ups, sRGB and Adobe RGB colour spaces, three colour modes (Vivid, Standard and Natural), two custom image settings, adjustable picture parameters (saturation, contrast and sharpness), monochrome mode (with toning effects), noise reduction (Weak, Strong, Off, selectable minimum ISO), simultaneous B&W and colour capture, distortion correction, ISO bracketing (via a firmware upgrade), intervalometer (with extended settings via a firmware upgrade), 20/81 thumbnail displays, playback zoom (up to 16x), playback editing (Resize, Trim, Level Compensation – auto or manual, White Balance Compensation, Skew Correction), DPOF support, copyright info (via a firmware upgrade). S10 and P10 modules have image stabilisation via sensor shift.

Power: One 3.6 volt/1700 mAh rechargeable lithium-ion battery pack (DB-90 type).

Dimensions (WxHxD): body only = 113.9x70.2x28.9.0 mm.

Weight: body only = 160 grams (without battery pack).

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2024 SHOW IMPRESSIONS

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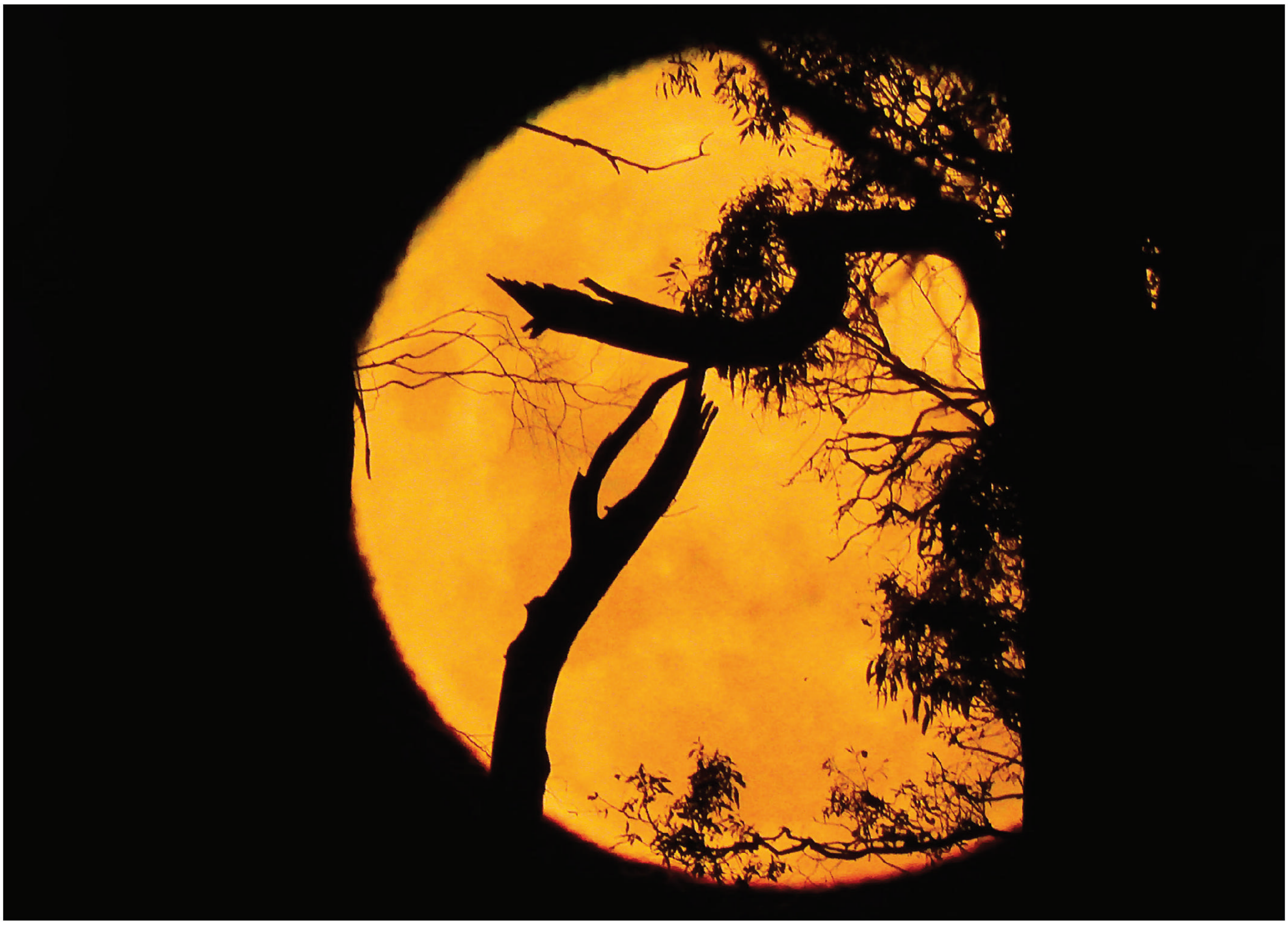
Sonus faber
in every detail.
YAMAHA

# SIGMA SHOWCASE



## WINNER

Using a long lens for very tight framing enabled Showcase regular **John Walker** to create this intriguing abstract of trees silhouetted against a rising Moon. He's titled the image Moon Tree, and it was shot with a Nikon P900 on a tripod and with the zoom at an effective 357mm. John comments, "I look for three things in my images – colour shape and subject matter – and the Moon never fails to come though".

---

## SIGMA SHOWCASE

**Tell us how you did it!** When you enter the Sigma Showcase, remember to explain any tips and techniques you used to achieve the result. Also, let us know the type of camera and lens. Enter by email (see next page).

1.TITLE CAMERA LENS

2.TITLE CAMERA LENS

3.TITLE CAMERA LENS

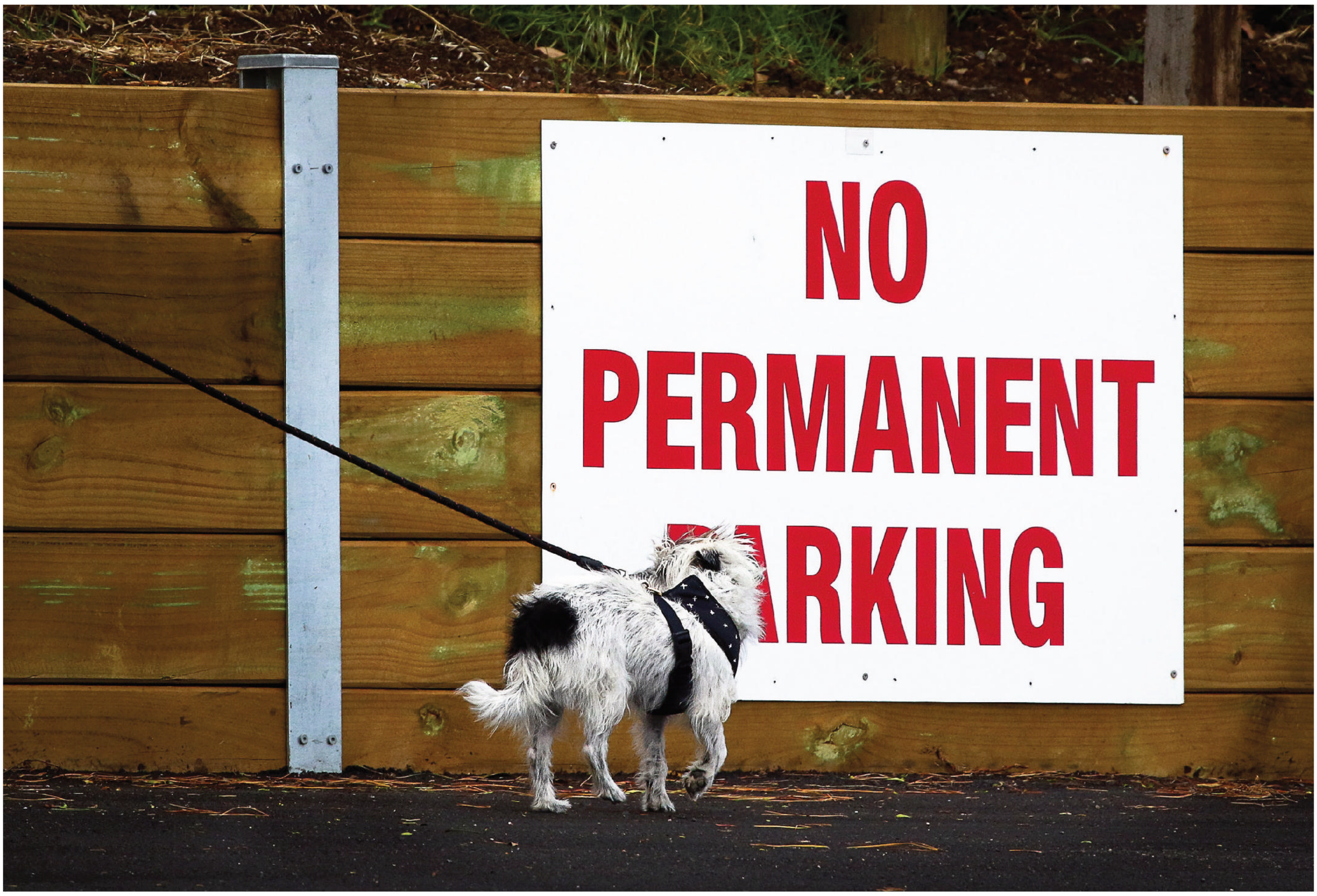
4.TITLE CAMERA LENS

NAME

ADDRESS

STATE POSTCODE TELEPHONE

**Email to: camera@futurenet.com**



# 2024 SIGMA SHOWCASE SIXTH ROUND WINNERS

## HIGHLY COMMENDED

Who doesn't love a visual pun so we give you No Permanent Barking. The sharp eye of **Graeme O'Rourke** spotted the amusing juxtaposition of pooch and signage, and was quick enough to snap it with his Canon EOS 7D Mark II which was fitted with the Canon EF 100-400mm f/4.5-5.6 L IS II USM telezoom.

## 2025 SIGMA SHOWCASE – OPEN FOR ENTRIES

Sigma lenses is the sponsor for our Showcase competition, made possible through the generosity of the Australian distributor C.R. Kennedy & Company Pty Ltd. The grand prize for the 2025 Sigma Showcase is a Sigma lens to the value of $1000 and the winner can pick the model and the mount that they want.

Additionally, the winner of each round receives a complimentary six-issue subscription to Australian Camera magazine. If you already subscribe, your prize subscription will commence upon the expiry of your paid one.

You can enter the Sigma Showcase as many times as you like during the year, submitting up to four photographs each time. The entries received after the 2025 competition's new closing date of 31 December 2025 will be automatically entered in the 2026 Sigma Showcase which. Obviously, kicks off on 1 January 2026.

Note that it is not a requirement that entries to the Sigma Showcase be taken with a Sigma camera or lens. Read the accompanying rules carefully and get snapping.

The grand prize winner for the 2024 competition will be announced in the next issue.

## ENTRY GUIDELINES

You can enter the Sigma Showcase by emailing your entries as attachments to camera@futurenet.com Please note that we are no longer accepting physical entries. **The requirements for submitting digital files are as follows.**

- 300 dpi resolution, and at a file size which enables a reproduction of up to 20x15 cm. Please avoid submitting overly large file sizes, especially when emailing the images. Up to 2.0 MB in file size is more than sufficient.
- Digital retouching and manipulation is permitted, but the judges will continue to reward good in-camera techniques.
- Full details of the camera, lens and any retouching must be supplied with the image. Images can be titled if you wish, but this isn't essential.
- Up to four images may be permitted per entry.

**What We Need To Know:** We'd like to know a bit about your entries, so supplying the details below will help the judges better assess your images. Please feel free to add any other information that you feel is important.

- Title (optional)
- Camera
- Lens
- Exposure - shutter speed, aperture and ISO
- Location and/or situation
- Post camera processing (if any)
- Additional Comments
- Your mailing address

# DIGITAL SLR CAMERAS BUYER’S CHECK LIST

**THIS CHECKLIST** is designed to allow direct comparisons between different camera models, listed here in price order within each brand. The published prices are mostly supplied by the distributors as recommended retail prices (RRPs). However, some distributors no longer supply RRPs to the media, so it has become necessary to determine an ‘estimated street price’ derived from the range of prices for a model published by retailers. Where this has been necessary, the letter ‘E’ appears at the start of the entry.

A dot appearing in a column indicates that the feature is available on the camera model listed. Where a specification or product detail hasn’t yet been published or confirmed, the letters TBA (to be announced) or TBC (to be confirmed) are used. If a feature is irrelevant to a particular model – such as mirror lock-up for compact system cameras – then n/a (not applicable) is used. Every effort is made to ensure accuracy; please send any corrections to **camera@futurenet.com.**

| | | | | Sensor Size | | | Sensor Type | | | File Formats | | | Memory Cards | | | | | | | Exposure Modes | | | | | | Features | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Model | Price (Body Only Unless Noted With Asterisk *) | Megapixels (Effective) | Full-Frame | APS/DX | Four-Thirds | CCD | CMOS | Foveon | RAW | TIFF | JPEG | CF/XQD/CFast | Memory Stick | SD/SDHC/SDXC | Continuous Shooting Speed (fps) | Buffer Length (U=Unlimited) Max. Resolution | Autofocus Points | Metering Pixels/Zones | Program | Subject Programs | Aperture Priority | Shutter Priority | Manual | Shutter Speeds | Built-In Flash | Anti-Dust | FHD Video | 4K Video | Anti-Shake In Body | Wi-Fi | Live View | Weather Proofing | Monitor Size (cm) | Weight (Body Only) | Review Issue |
| E | Canon EOS 3000D* | $699 | 18 | | • | | | • | | • | | • | | | • | 3 | 110 | 9 | 63 | • | • | • | • | • | 30-1/4000 | • | | • | | | • | • | | 6.8 | 436 | Jul/Aug ‘18 |
| E | Canon EOS 1500D* | $849 | 24.1 | | • | | | • | | • | | • | | | • | 3 | 150 | 9 | 63 | • | • | • | • | • | 30-1/4000 | • | | • | | | • | • | | 7.62 | 475 | Jul/Aug ‘18 |
| E | Canon EOS 200D Mark II* | $1,249 | 24.1 | | • | | | • | | • | | • | | | • | 5 | U | 9 | 63 | • | • | • | • | • | 30-1/4000 | • | • | • | • | | • | • | | 7.62 | 402 | |
| E | Canon EOS 850D* | $1,379 | 24.1 | | • | | | • | | • | | • | | | • | 7 | 170 | 45 | 220K | • | • | • | • | • | 30-1/4000 | • | • | • | • | | • | • | | 8.1 | 515 | |
| E | Canon EOS 90D | $2,099 | 32.5 | | • | | | • | | • | | • | | | • | 10 | 58 | 45 | 220K | • | • | • | • | • | 30-1/16,000 | • | • | • | • | | • | • | • | 7.7 | 701 | Nov/Dec ‘19 |
| E | Canon EOS 6D Mark II | $2,189 | 26.2 | • | | | | • | | • | | • | | | • | 6.5 | 110 | 45 | 7560 | • | • | • | • | • | 30-1/4000 | | • | • | | | • | • | • | 7.62 | 685 | Jan/Feb ‘18 |
| E | Canon EOS 5D Mark IV | $3,699 | 30.4 | • | | | | • | | • | | • | • | | • | 7 | U | 61 | 150K | • | | • | • | • | 30-1/8000 | | • | • | • | | • | • | • | 8.1 | 890 | Jan/Feb ‘17 |
| E | Canon EOS-1DX Mark III | $11,999 | 20.1 | • | | | | • | | • | | • | • | | | 16 | 1000+ | 191 | 400k | • | | • | • | • | 30/1/8000 | | • | • | • | | • | • | • | 8.1 | 1440 | May/Jun ‘20 |
| | Nikon D7500 | $1,599 | 20.9 | | • | | | • | | • | | • | | | • | 8 | 100 | 51 | 180K | • | • | • | • | • | 30-1/8000 | • | • | • | • | | • | • | • | 8.1 | 640 | |
| | Nikon D780 | $3,599 | 24.5 | • | | | | • | | • | | • | | | • | 7 | 100 | 51 | 180k | • | | • | • | • | 900-1/8000 | | • | • | • | | • | • | • | 8.1 | 755 | Jul/Aug ‘20 |
| | Nikon D850 | $4,549 | 45.7 | • | | | | • | | • | • | • | • | | • | 7 | 200 | 153 | 180K | • | | • | • | • | 30-1/8000 | | • | • | • | | • | • | • | 8.1 | 915 | Nov/Dec ‘17 |
| | Nikon D6 | $10,699 | 20.8 | • | | | | • | | • | | • | • | | | 14 | 200 | 105 | 180K | • | | • | • | | 900-1/8000 | | • | • | • | | • | • | • | 8.1 | 1270 | Nov/Dec ‘20 |
| | Pentax KF | $1,299 | 24.24 | | • | | | • | | • | | • | | | • | 6 | 40 | 11 | 77 | • | • | • | • | • | 30-1/6000 | • | • | • | | • | • | • | • | 7.62 | 625 | |
| | Pentax K-3 Mark III | $2,699 | 25.73 | | • | | | • | | • | | • | | | • | 12 | 37 | 101 | 370K | • | | • | • | • | 30-1/8000 | | • | • | • | • | • | • | • | 8.1 | 735 | Issue 423 |
| | Pentax K-1 Mark II Limited | $4,099 | 36.4 | • | | | | • | | • | | • | | | • | 4.4 | 70 | 33 | 86K | • | | • | • | • | 30-1/8000 | | • | • | | • | • | • | • | 8.1 | 925 | |

## DIGITAL RANGEFINDER CAMERAS

| | Model | Price | Megapixels | Full-Frame | APS/DX | Four-Thirds | CCD | CMOS | Foveon | RAW | TIFF | JPEG | CF/XQD/CFast | Memory Stick | SD/SDHC/SDXC | fps | Buffer | AF Points | Metering | Program | Subject Programs | Aperture Priority | Shutter Priority | Manual | Shutter Speeds | Built-In Flash | Anti-Dust | FHD Video | 4K Video | Anti-Shake In Body | Wi-Fi | Live View | Weather Proofing | Monitor Size (cm) | Weight | Review Issue |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Leica M11 | $15,090 | 60.3 | • | | | | • | | • | | • | | | • | 4.5 | 100 | MF/ RF | TBC | | | • | | • | 60-1/16,000 | | | | | | • | • | | 7.5 | 455 | Mar/Apr ‘22 |
| | Leica M11-P | $15,490 | 60.3 | • | | | | • | | • | | • | | | • | 4.5 | 100 | MF/ RF | TBC | | | • | | • | 60-1/16,000 | | | | | | • | • | | 7.5 | 455 | Issue 425 |
| | Leica M11-D | $15,990 | 60.3 | • | | | | • | | • | | • | | | • | 4.5 | 100 | MF/ RF | TBC | | | • | | • | 60-1/16,000 | | | | | | • | | | | 457 | |
| | Leica M11 Monochrom | $16,290 | 60.3 | • | | | | • | | • | | • | | | • | 4.5 | 100 | MF/ RF | TBC | | | • | | • | 60-1/16,000 | | | | | | • | • | | 7.5 | 461 | |

## MIRRORLESS CAMERAS

| | Model | Price | Megapixels | Full-Frame | APS/DX | Four-Thirds | CCD | CMOS | Foveon | RAW | TIFF | JPEG | CF/XQD/CFast | Memory Stick | SD/SDHC/SDXC | fps | Buffer | AF Points | Metering | Program | Subject Programs | Aperture Priority | Shutter Priority | Manual | Shutter Speeds | Built-In Flash | Anti-Dust | FHD Video | 4K Video | Anti-Shake In Body | Wi-Fi | Live View | Weather Proofing | Monitor Size (cm) | Weight | Review Issue |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Canon EOS R100* | $1,049 | 24.1 | | • | | | • | | • | | • | | | • | 6.5 | 97 | 3975 | 384 | • | • | • | • | • | 30-1/4000 | • | | • | • | | • | • | | 7.5 | 309 | |
| | Canon EOS R50* | $1,399 | 24.2 | | • | | | • | | • | | • | | | • | 15 | 42 | 4503 | 384 | • | • | • | • | • | 30-1/8000 | • | | • | • | | • | • | | 7.5 | 328 | Issue 423 |
| | Canon EOS R10* | $1,729 | 24.2 | | • | | | • | | • | | • | | | • | 23 | 123 | 4503 | 384 | • | • | • | • | • | 30-1/4000 | • | • | • | • | | • | • | | 7.62 | 429 | Issue 419 |
| | Canon EOS RP | $1,819 | 26 | • | | | | • | | • | | • | | | • | 5 | U | 4779 | 384 | • | • | • | • | • | 30-1/4000 | | • | • | • | | • | • | • | 7.62 | 440 | May/June ‘19 |
| | Canon EOS R7 | $2,469 | 32.5 | | • | | | • | | • | | • | | | • | 30 | 184 | 5915 | 384 | • | • | • | • | • | 30-1/8000 | | • | • | • | • | • | • | • | 7.62 | 612 | Jul/Aug ‘22 |
| | Canon EOS R8 | $2,599 | 24.2 | • | | | | • | | • | | • | | | • | 40 | 1000+ | 4897 | 384 | • | • | • | • | • | 30-1/16,000 | | • | • | • | | • | • | • | 7.5 | 414 | Issue 423 |
| | Canon EOS R6 Mark II | $4,199 | 24.2 | • | | | | • | | • | | • | | | • | 40 | 190 | 4897 | 384 | • | • | • | • | • | 30-1/16,000 | | • | • | • | • | • | • | • | 7.62 | 588 | Issue 421 |
| | Canon EOS R5 | $5,499 | 45 | • | | | | • | | • | | • | • | | • | 20 | 350 | 5940 | 384 | • | | • | • | • | 30-1/8000 | | • | • | • | • | • | • | • | 8.1 | 650 | Sept/Oct ‘20 |
| | Canon EOS R5 Mark II | $6,699 | 45 | • | | | | • | | • | | • | • | | • | 30 | 760 | 5850 | 6144 | • | | • | • | | 30-1/32,000 | | • | • | • | • | • | • | • | 8.1 | 588 | Issue 428 |
| | Canon EOS R3 | $8,199 | 24.1 | • | | | | • | | • | | • | • | | • | 30 | 540 | 4779 | 384 | • | | • | • | • | 30-1/64,000 | | • | • | • | • | • | • | • | 8.1 | 915 | Jan/Feb ‘22 |
| | Canon EOS R1 | $10,990 | 24.2 | • | | | | • | | • | | • | • | | | 40 | 500 | 4368 | 6144 | • | | • | • | • | 30-1/64,000 | | • | • | • | • | • | • | • | 8.1 | 920 | |
| | Fujifilm X-T30 II | $1,449 | 26.1 | | • | | | • | | • | | • | | | • | 20 | 32 | 425 | 256 | • | | • | • | • | 900-1/32,000 | • | • | • | • | • | • | • | | 7.62 | 329 | Jan/Feb ‘22 |
| | Fujifilm X-M5 | $1,449 | 26.1 | | • | | | • | | • | | • | | | • | 20 | 127 | 425 | 256 | • | | • | • | • | 900-1/32,000 | | • | • | • | | • | | | 7.62 | 307 | Issue 430 |
| | Fujifilm X-S20 | $2,349 | 26.1 | | • | | | • | | • | | • | | | • | 20 | 256 | 425 | 256 | • | | • | • | • | 900-1/32,000 | • | • | • | • | • | • | • | | 7.62 | 410 | Issue 424 |
| | Fujifilm X-T50 | $2,599 | 40.2 | | • | | | • | | • | | • | | | • | 20 | 168 | 425 | 256 | • | | • | • | • | 900-1/180,000 | • | • | • | • | • | • | • | | 7.62 | 389 | Issue 428 |
| | Fujifilm X-T5 | $2,899 | 40.2 | | • | | | • | | • | • | • | | | • | 15 | 119 | 425 | 256 | • | | • | • | • | 900-1/180,000 | | • | • | • | • | • | • | • | 7.62 | 476 | Issue 422 |
| | Fujifilm X-H2 | $3,399 | 40.2 | | • | | | • | | • | • | • | • | | • | 13 | 1000+ | 425 | 256 | • | | • | • | • | 900-1/180,000 | | • | • | • | • | • | • | • | 7.62 | 579 | Issue 420 |
| | Fujifilm X-H2S | $3,999 | 26.1 | | • | | | • | | • | • | • | • | | • | 40 | 1000+ | 425 | 256 | • | | • | • | • | 900-1/32,000 | | • | • | • | • | • | • | • | 7.62 | 579 | Jul/Aug ‘22 |

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FUTURE

# MIRRORLESS CAMERAS BUYER'S CHECK LIST

| | | | Sensor Size | | | Sensor Type | | File Formats | | | Memory Cards | | | | | | | Exposure Modes | | | | | | Features | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Model**<br>* single lens kit<br>** twin lens kit | **Price (Body Only Unless Noted With Asterisk*)** | **Megapixels (Effective)** | **Full-Frame** | **APS/DX** | **Four Thirds** | **CMOS** | **Foveon** | **RAW** | **TIFF** | **JPEG** | **Compact Flash** | **Memory Stick** | **SD/SDHC/SDXC** * = microSD | **Continuous Shooting Speed (fps)** | **Max. Resolution Buffer Length (U=Unlimited)** | **Autofocus Points** | **Metering Zones** | **Program** | **Subject Programs** | **Aperture Priority** | **Shutter Priority** | **Manual** | **Shutter Speeds** | **Built-In Flash** | **Anti-Dust** | **FHD Video** | **4K Video** | **Anti-Shake In Body** | **Wi-Fi** | **Built-In Viewfinder** | **Weather Proofing** | **Monitor Size (cm)** | **Weight (Body Only)** | **Review Issue** |
| Leica SL3-S | $8,990 | 24.6 | ● | | | ● | | ● | | ● | ● | | ● | 30 | | 779 | TBC | ● | | ● | ● | ● | 1800-1/16,000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 768 | |
| Leica SL3 | $11,890 | 60.3 | ● | | | ● | | ● | | ● | ● | | ● | 15 | 70 | 315 | TBC | ● | | ● | ● | ● | 3600-1/16,000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 769 | Issue 429 |
| Nikon Z30* | $1,549 | 20.9 | | ● | | ● | | ● | | ● | | | ● | 11 | 71 | 209 | TBC | ● | | ● | ● | ● | 30-1/4000 | ● | | ● | ● | | ● | | | 7.5 | 350 | |
| Nikon Z50* | $1,469 | 20.9 | | ● | | ● | | ● | | ● | | | ● | 11 | 71 | 209 | TBC | ● | ● | ● | ● | ● | 30-1/4000 | ● | | ● | ● | | ● | ● | | 8.1 | 395 | |
| Nikon Zfc* | $1,799 | 20.9 | | ● | | ● | | ● | | ● | | | ● | 11 | 71 | 209 | TBC | ● | ● | ● | ● | ● | 30-1/4000 | ● | | ● | ● | | ● | ● | | 7.5 | 390 | Nov/Dec '21 |
| Nikon Z50II* | $2,279 | 20.9 | | ● | | ● | | ● | | ● | | | ● | 30 | 200 | 231 | TBC | ● | ● | ● | ● | ● | 900-1/4000 | ● | | ● | ● | | ● | ● | | 8.1 | 495 | |
| Nikon Z5 | $2,399 | 24.3 | ● | | | ● | | ● | | ● | | | ● | 4.5 | 100 | 273 | TBC | ● | | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 590 | Jan/Feb '21 |
| Nikon Z6II | $3,699 | 24.5 | ● | | | ● | | ● | ● | ● | ● | | ● | 14 | 200 | 273 | TBC | ● | | ● | ● | ● | 900-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 615 | May/June '21 |
| Nikon Zf | $3,499 | 24.5 | ● | | | ● | | ● | ● | ● | | | ● | 30 | 120 | 273 | TBC | ● | | ● | ● | ● | 900-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 630 | Issue 425 |
| Nikon Z6III | $4,199 | 24.5 | ● | | | ● | | ● | | ● | ● | | ● | 60 | 1000+ | 299 | TBC | ● | | ● | ● | ● | 900-1/16,000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 660 | Issue 429 |
| Nikon Z7II | $5,549 | 45.7 | ● | | | ● | | ● | ● | ● | ● | | ● | 10 | 200 | 493 | TBC | ● | | ● | ● | ● | 900-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 615 | |
| Nikon Z8 | $7,449 | 45.7 | ● | | | ● | | ● | ● | ● | ● | | ● | 20 | 1000+ | 493 | TBC | ● | | ● | ● | ● | 900-1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 820 | Issue 424 |
| Nikon Z9 | $9,899 | 45.7 | ● | | | ● | | ● | ● | ● | ● | | | 30 | 1000+ | 493 | TBC | ● | | ● | ● | ● | 900-1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 1160 | Jan/Feb '22 |
| Olympus OM-D E-M10 IV | $999 | 20.3 | | | ● | ● | | ● | | ● | | | ● | 15 | 49 | 121 | 324 | ● | ● | ● | ● | ● | 60-1/16,000 | ● | ● | ● | ● | ● | ● | ● | | 7.62 | 335 | Nov/Dec '20 |
| Olympus PEN E-PL10* | $1,199 | 16.1 | | | ● | ● | | ● | | ● | | | ● | 8.6 | 21 | 121 | 324 | ● | ● | ● | ● | ● | 60-1/16,000 | ● | ● | ● | ● | ● | ● | | | 7.62 | 332 | |
| OM System OM-5 | $1,599 | 20.4 | | | ● | ● | | ● | | ● | | | ● | 30 | 20 | 121 | 324 | ● | | ● | ● | ● | 60-1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 7.62 | 366 | Issue 421 |
| OM System OM-1 | $2,699 | 20.4 | | | ● | ● | | ● | | ● | | | ● | 120 | 92 | 1053 | 324 | ● | | ● | ● | ● | 60-1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 7.62 | 511 | Mar/Apr '22 |
| OM System OM-3 | $3,199 | 20.4 | | | ● | ● | | ● | | ● | | | ● | 120 | | 1053 | 324 | ● | | ● | ● | ● | 60/1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 7.62 | 413 | Issue 430 |
| OM System OM-1 Mark II | $3,699 | 20.4 | | | ● | ● | | ● | | ● | | | ● | 120 | 219 | 1053 | 324 | ● | | ● | ● | ● | 60-1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 7.62 | 511 | Issue 427 |
| Panasonic Lumix G100V* | $1,299 | 20.3 | | | ● | ● | | ● | | ● | | | ● | 10 | 480 | 49 | 1728 | ● | ● | ● | ● | ● | 60-1/16,000 | ● | ● | ● | ● | ● | ● | ● | | 7.62 | 303 | |
| Panasonic Lumix G85* | $1,449 | 16 | | | ● | ● | | ● | | ● | | | ● | 9 | 100 | 49 | 1728 | ● | ● | ● | ● | ● | 60-1/16,000 | ● | ● | ● | ● | ● | ● | ● | ● | 7.62 | 453 | Jan/Feb '17 |
| Panasonic Lumix G95 | $1,599 | 20.3 | | | ● | ● | | ● | | ● | | | ● | 9 | 300 | 49 | 1728 | ● | ● | ● | ● | ● | 60-1/16,000 | ● | ● | ● | ● | ● | ● | ● | ● | 7.62 | 484 | Nov/Dec '19 |
| Panasonic Lumix G9 | $1,599 | 20.3 | | | ● | ● | | ● | | ● | | | ● | 20 | 600 | 225 | 1728 | ● | | ● | ● | ● | 60-1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 7.62 | 579 | Jan/Feb '18 |
| Panasonic Lumix G90* | $1,699 | 20.3 | | | ● | ● | | ● | | ● | | | ● | 9 | 300 | 49 | 1728 | ● | ● | ● | ● | ● | 60-1/16,000 | ● | ● | ● | ● | ● | ● | ● | ● | 7.62 | 481 | |
| Panasonic Lumix GH5 II | $2,099 | 20.3 | | | ● | ● | | ● | | ● | | | ● | 12 | 999 | 225 | 1728 | ● | | ● | ● | ● | 60-1/16,000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 647 | Sept/Oct '21 |
| Panasonic Lumix S9 | $2,699 | 24.2 | ● | | | ● | | ● | | ● | | | ● | 30 | 36 | 779 | 1728 | ● | | ● | ● | ● | 60-1/8000 | | ● | ● | ● | ● | ● | | | 7.62 | 403 | |
| Panasonic Lumix S5 | $2,799 | 24.2 | ● | | | ● | | ● | | ● | | | ● | 7 | 999 | 225 | 1728 | ● | | ● | ● | ● | 60-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 630 | Jan/Feb '21 |
| Panasonic Lumix S5II | $3,199 | 24.2 | ● | | | ● | | ● | | ● | | | ● | 30 | 300+ | 779 | 1728 | ● | | ● | ● | ● | 60-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.62 | 657 | Issue 422 |
| Panasonic Lumix G9 II | $3,299 | 25.2 | | | ● | ● | | ● | | ● | | | ● | 75 | 225 | 779 | 1728 | ● | | ● | ● | ● | 60-1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 7.62 | 575 | Issue 427 |
| Panasonic Lumix S5IIX | $3,499 | 24.2 | ● | | | ● | | ● | | ● | | | ● | 30 | 300+ | 779 | 1728 | ● | | ● | ● | ● | 60-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.62 | 657 | |
| Panasonic Lumix S1 | $3,599 | 24.2 | ● | | | ● | | ● | | ● | ● | | ● | 9 | 999 | 225 | 1728 | ● | | ● | ● | ● | 60-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 899 | |
| Panasonic Lumix GH6 | $3,699 | 25.5 | | | ● | ● | | ● | | ● | ● | | ● | 75 | 200 | 315 | 1728 | ● | | ● | ● | ● | 60-1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 739 | Issue 419 |
| Panasonic Lumix GH7 | $3,899 | 25.2 | | | ● | ● | | ● | | ● | ● | | ● | 75 | 260 | 315 | 1728 | ● | | ● | ● | ● | 60-1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 721 | |
| Panasonic Lumix S1R | $5,299 | 47.3 | ● | | | ● | | ● | | ● | ● | | ● | 9 | 50 | 225 | 1728 | ● | | ● | ● | ● | 60-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 898 | Sept/Oct '19 |
| Panasonic Lumix S1H | $5,999 | 24.2 | ● | | | ● | | ● | | ● | | | ● | 9 | 999 | 225 | 1728 | ● | | ● | ● | ● | 60-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 1052 | Mar/Apr '20 |
| Sigma fp L | $3,899 | 61.2 | ● | | | ● | | ● | | ● | | | ● | 10 | 14 | 49 | TBC | ● | | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 8.1 | 375 | |
| Sony Alpha ZV-E10 | $1,099 | 24.2 | | ● | | ● | | ● | | ● | | ● | ● | 11 | 99 | 425 | 1200 | ● | ● | ● | ● | ● | 30-1/4000 | | ● | ● | ● | | ● | | | 7.5 | 343 | |
| Sony Alpha 6400 | $1,299 | 24.2 | | ● | | ● | | ● | | ● | | ● | ● | 11 | 115 | 425 | 1200 | ● | ● | ● | ● | ● | 30-1/4000 | ● | ● | ● | ● | ● | ● | ● | ● | 7.5 | 403 | Sept/Oct '19 |
| Sony Alpha ZV-E10 II | $1,699 | 26 | | ● | | ● | | ● | | ● | | | ● | 11 | 1000+ | 759 | 1200 | ● | ● | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | | | 7.5 | 292 | |
| Sony Alpha 6700 | $2,299 | 26 | | ● | | ● | | ● | | ● | | | ● | 11 | 143 | 759 | 1200 | ● | | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 409 | |
| Sony Alpha 7 III | $2,379 | 24.2 | ● | | | ● | | ● | | ● | | ● | ● | 10 | 163 | 693 | 1200 | ● | ● | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 650 | Sept/Oct '18 |
| Sony Alpha 7C | $3,299 | 24.2 | ● | | | ● | | ● | | ● | | | ● | 10 | 223 | 693 | 1200 | ● | | ● | ● | ● | 30-1/4000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 509 | |
| Sony Alpha ZV-E1 | $3,249 | 12.1 | ● | | | ● | | ● | | ● | | | ● | 10 | 1000+ | 759 | 1200 | ● | ● | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | | ● | 7.5 | 400 | |
| Sony Alpha 7C II | $3,299 | 33 | ● | | | ● | | ● | | ● | | | ● | 10 | 88 | 759 | 1200 | ● | | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 429 | |
| Sony Alpha 7 IV | $3,499 | 33 | ● | | | ● | | ● | | ● | ● | | ● | 10 | 1000+ | 759 | 1200 | ● | | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 658 | |
| Sony Alpha 7CR | $4,799 | 61 | ● | | | ● | | ● | | ● | | | ● | 8 | 48 | 693 | 1200 | ● | | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 430 | |
| Sony Alpha 7R III | $4,499 | 42.4 | ● | | | ● | | ● | | ● | | ● | ● | 10 | 76 | 425 | 1200 | ● | | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 657 | May/June '18 |
| Sony Alpha 7S III | $4,699 | 12.1 | ● | | | ● | | ● | | ● | ● | | ● | 10 | 1000+ | 759 | 1200 | ● | | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 699 | Mar/Apr '21 |
| Sony Alpha 7R IV(A) | $4,999 | 61 | ● | | | ● | | ● | | ● | | ● | ● | 10 | 68 | 567 | 1200 | ● | | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 665 | Jan/Feb '20 |
| Sony Alpha 7R V | $5,499 | 61 | ● | | | ● | | ● | | ● | ● | | ● | 10 | 1000+ | 693 | 1200 | ● | | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 8 | 638 | |
| Sony Alpha 9 II | $5,689 | 24.2 | ● | | | ● | | ● | | ● | | ● | ● | 20 | 361 | 693 | 1200 | ● | | ● | ● | ● | 30-1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 678 | May/June '20 |
| Sony Alpha 1 | $8,499 | 50.1 | ● | | | ● | | ● | | ● | ● | | ● | 30 | 165 | 759 | 1200 | ● | | ● | ● | ● | 30-1/8000 | | ● | ● | ● | ● | ● | ● | ● | 7.5 | 725 | |
| Sony Alpha 9 III | $9,999 | 24.6 | ● | | | ● | | ● | | ● | ● | | ● | 120 | 192 | 759 | 1200 | ● | | ● | ● | ● | 30-1/80,000 | | ● | ● | ● | ● | ● | ● | ● | 8 | 617 | |
| Sony Alpha 1 II | $10,999 | 50.1 | ● | | | ● | | ● | | ● | ● | | ● | 30 | 400 | 759 | 1200 | ● | | ● | ● | ● | 30-1/32,000 | | ● | ● | ● | ● | ● | ● | ● | 8 | 658 | |

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